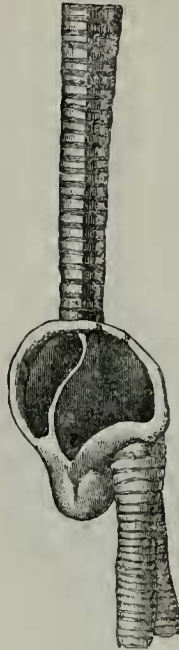


Fig. 7.



Lower part of trachea of *Metopiana peposaca* ♂ (side view).

The cæca in this specimen were  $5\frac{1}{2}$  and 6 inches in length, the whole intestinal canal measuring  $4\frac{1}{2}$  feet.

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March 16, 1875.

Dr. A. Günther, F.R.S., Vice-President, in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during February 1875 :—

The total number of registered additions to the Society's Menagerie during the month of February was 146 ; of which 1 was by birth, 20 were by presentation, 112 by purchase, 6 received in exchange, and 7 received on deposit. The total number of departures during the same period by death and removals was 96.

The most noticeable additions during the month were :—

1. A Peguan Tree-Shrew (*Tupaia peguana*), presented by the Hon. Ashley Eden, C.S.I., Chief Commissioner, Rangoon, British Burmah. This is believed to be the first living *Tupaia* of any species that has reached Europe.

2. A Blanford's Squirrel (*Sciurus blanfordi*), presented by Mrs. Dunn, 8th February. This Squirrel was received in the same cage as the Tree-Shrew, and is so much like it in general external appear-





J. Smit del. & lith.

M. & N. Hanhart imp.

CHRYSOTIS XANTHOLORA.

ance as almost to lead to the idea that we have here a case of mimetic resemblance on the part of the insectivorous mammal.

3. Four Quica Opossums (*Didelphys quica*), a mother and three young, purchased 12th February. These are the first examples of this species we have as yet received.

4. A yellow-lored Amazon (*Chrysotis xantholora*), purchased 26th February, being the first example of this rare Parrot received alive. Mr. Salvin (Ibis, 1874, p. 327) has lately shown that Yucatan is the true habitat of this species. The only specimens of it in this country are, I believe, those in the British Museum, obtained by Mr. Dyson, upon which Mr. Gray based his description. The accompanying figure (Plate XXVI.) will serve to make this species better known. We have likewise a living example of the nearly allied *Chrysotis albifrons*.

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The following communication, addressed to the Secretary by Capt. John Biddulph, dated Government House, Calcutta, Nov. 5, 1874, was read:—

“While we were in Kashgar, numerous specimens of a gigantic wild sheep were brought in from the Thien-Shan range by Colonel Gordon’s party. This was taken by us to be the *O. polii*; and a drawing of the animal by Colonel Gordon was sent to the Society, and published in the ‘Proceedings’ (1874, p. 425, pl. liii.).

“In our trip to Wahhan and back in April and May, numerous specimens of the horns of the *O. polii* were picked up on the Pamir and brought away. Those of our party who had seen the wild sheep alive on the Thien-Shan, pronounced it to be identical with the *O. polii* we saw on the Pamir, though it was remarked by us at the time that the Pamir horns ran larger than the Thien-Shan ones—the latter, on fine full-grown animals, not measuring as a rule over 48 inches from base to tip, measured round the curve, whereas on the Pamir any number of horns averaging from 50 to 60 inches could be picked up; and one head was picked up measuring 65 inches.

“It was not till I arrived in Calcutta that I had an opportunity of seeing the two together, when I was at once struck by the great differences in shape and general appearance.

“After a careful examination of the few specimens available, and the photographed animals of the Thien-Shan, I cannot help coming to the conclusion that they differ sufficiently to warrant the idea that they are distinct animals.

“The accompanying drawings, carefully made to scale, will give a good idea of the two heads.

“The chief characteristic of the *O. polii* head is the bold and elegant sweep of the horns, of which the tips diverge so much in the second curve as to be 48 and 50 inches apart in heads of an average size.

“The head of the Thien-Shan Sheep approaches somewhat in appearance the head of the *O. ammon*, the horns being more massive at the base than the *O. polii*, and not diverging at the points to the



same extent; in fact the second curve is not so decided as in the *O. polii*; but the first curve is much rounder.

"I am therefore inclined to believe that the wild sheep of the Thien-Shan belongs to a species hitherto not described. It certainly is not the *O. ammon* of the Himalayas, as it differs not only in the shape of the horns but also in being of a smaller size, having a longer tail and smaller ears.

"A full description of the Thien-Shan *Ovis* was sent to the Zoological Society with the drawing; but I believe the *O. polii* has never yet been described in the flesh.

"The above opinion is not formed from single specimens, but, directly my attention was called to it, I at once remarked that the characteristic differences held good through all the specimens brought away."

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A letter was read from the Rev. S. J. Whitmee, C.M.Z.S., dated Samoa, South Pacific, Nov. 17, 1874, giving particulars as to the occurrence of the Palolo (*Palola viridis*) on the shores of that island in 1874. In that year these singular worms had appeared on Nov. 1st and 2nd, Samoan time, = Oct. 31st and Nov. 1st by Greenwich date. There were very few on the first day; but the supply was large on the second. Mr. Whitmee had removed the ova, which were well developed, and had endeavoured to hatch them in vessels of sea-water regularly changed, but had only been able to keep them alive four days. Drawings of the ova in different stages accompanied the communication. It would appear, therefore, probable that the periodical appearance of the Palolo in such prodigious numbers might have something to do with its reproduction.

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Mr. Howard Saunders, F.Z.S., exhibited a specimen of a Gull, which he considered referable to *Larus fuscus*, obtained at Magdalena Bay, Lower California, by Mr. Gervaise Mathew, R.N., of H.M.S. 'Resolute,' in November 1873, being the first instance recorded of the occurrence of this species in the New World, and made the following remarks:—

"In colour of mantle, webs of primaries, feet, and in every respect but one, this specimen appears to be identical with *Larus fuscus*. The sole difference consists in this—that in *L. fuscus* the tarsus is, so far as my experience goes, longer than the foot, including the middle toe-nail; but in this Californian specimen the reverse is the case. This may, of course, be an individual peculiarity; and the example in question is certainly much further off from *L. occidentalis*, Aud., than from true *L. fuscus*. In the coloration of the webs of the primaries it does not agree with *L. occidentalis*, a branch of the group which has *L. argentatus* for type, but perfectly coincides with *L. fuscus*, from which it differs in the size of the foot alone."

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The following communications were read:—

1. On the Structure and Affinities of the Musk-Deer  
(*Moschus moschiferus*, Linn.). By WILLIAM HENRY  
FLOWER, F.R.S., V.P.Z.S., &c.

[Received March 16, 1875.]

Almost all our knowledge of the visceral anatomy of the Musk-Deer is derived from Pallas\*. It is nearly a century since his classical work was published; and it does not appear that any other anatomist has had an opportunity of dissecting an animal of the species, the subject which furnished the material for the following notes having been the first which has ever been brought alive to Europe. Its arrival in the Society's Menagerie was thus announced by our Secretary in the 'Proceedings' for May 13th, 1869:—

"A female Musk (*Moschus moschiferus*), presented by Major F. R. Pollock †, Commissioner at Peshawur, and most carefully conveyed to this country by Lieut. C. H. T. Marshall, F.Z.S., from whom it was received March 31st. This animal had been captured in June 1867, in the hills of Cashmere, by Major Delmé Radcliffe, of the 88th Regiment, who shot both the parents, and brought it when quite a kid to Peshawur. It was now about two years old, and was believed to be the only Musk ever brought to Europe alive."

A very good figure, drawn from the living animal in a characteristic attitude, appeared in the 'Illustrated London News' for April 24th, 1869. I call particular attention to this, as all other published figures of the Musk-Deer appear to have been taken from skins or stuffed specimens, and give but an indifferent idea of the general external appearance of the animal.

It unfortunately died on October 27th of the same year, of pleuropneumonia and acute peritonitis, being then rather more than two and a half years old. All the permanent teeth were in place and the epiphyses of the long bones completely united, though those on the bodies of some of the dorsal vertebræ and on the pelvis were still separable.

The animal measured from the tip of the nose to the root of the tail 33 inches, and (being in an extreme state of emaciation) weighed 14lbs. 8oz.‡

*External Characters.*

Under this heading I have only thought necessary to record such characters as are not readily observed in mounted skins of the animal, which are now tolerably abundant in museums.

\* Spicilegia Zoologica, fasciculus xiii (1779).

† Now Sir Richard Pollock, K.C.S.I.

‡ Since the greater part of the following description was written, a male Pudu (*Cervus humilis*) died at the Society's Gardens; and Mr. Garrod has been so obliging as to forward it for my inspection. I have thus an opportunity of adding some comparisons between the viscera of the Musk and those of another Deer of about the same bulk; for though the former, having longer limbs and neck, has the appearance of being a considerably larger animal, there is but little difference in the size of the trunk.

There was no suborbital gland or crumen\*, no vestige of the abdominal musk-sac of the male†, nor of the gland described by Brandt on the outside of the thigh‡, nor of the tail-glands described by Hodgson§, in both cases in male animals; nor were there any interdigital glands in either feet, the depressed space between the toes, where the glands usually open, being covered with hair||.

The teats were two in number¶, placed on the hinder part of the abdomen, between the thighs, 1 inch in front of the anterior margin of the symphysis pubis,  $3\frac{1}{2}$  inches in front of the vulva, and  $\frac{6}{10}$  inch apart; each was  $\frac{1}{2}$  inch in length, soft, flaccid, slender, cylindrical, slightly tapering, and with a rounded apex. They were placed upon a nearly bare oval space,  $2\frac{1}{4}$  inches across, and 1 inch from before backwards, having only a few long fine silky hairs upon it. The space between this and the vulva was covered with hairs resembling those of the remainder of the abdomen, though softer and finer, especially at the hinder part.

A heart-shaped patch,  $\frac{7}{10}$  inch in diameter, surrounding the vulva, was covered with soft skin, perfectly bare, beset, especially near its margin and anterior portion, with numerous yellowish-white sebaceous glands. Within, but near the front end of this bare place, is situated the prominent conical eminence, formed by the anterior union of the labia, with a few short hairs upon it. Close behind this is the apex of the clitoris, at the anterior margin of the vulval orifice. The extremely short perinæum, the margin of the anus, and the prominences formed by the tuber ischii, were covered with very short, flattened, adpressed hairs, which pass into those which clothe the triangular under surface of the very brief tail. It is not quite correct to describe, as is usually done, the long hairs of the tail as only covering the upper surface and sides of the organ, for they pass under and completely surround the extreme tip. The skin adheres very closely to the end of the very slender, elongated, terminal caudal vertebra.

\* In the Pudu the crumen is a distinct involution of thickened integument, lodged in a deep pit in the bone, with an aperture half an inch in length. The lining membrane is white and corrugated, and has a few short, pointed, black hairs scattered over it. This organ, though generally present in the *Cervidae*, is rudimentary or absent in the Roe and in the South-American Deer of the section *Coassus*. It is also absent in *Hyomoschus* and *Tragulus*.

† For an account of this organ and its peculiar secretion, which constitutes the "musk" of commerce, with references to previous descriptions, see A. Milne-Edwards's valuable memoir entitled "Recherches sur la Famille des Chevrotains," Ann. des Sciences Nat. 5<sup>e</sup> série, tome ii. (1864), which also contains a description of the osteology of *Moschus*, and a short *résumé* of Pallas's observations on its splanchnology.

‡ J. F. Brandt, "Note sur la découverte d'une glande particulière qui se trouve sur la face extérieure de la cuisse du *Moschus moschiferus*," Bull. Scientif. de l'Acad. d. St. Pétersb. tom. i. 1836, p. 174.

§ B. H. Hodgson, "On a new organ in the genus *Moschus*," Bengal Journal Asiatic Soc. x. 1841, p. 795.

|| In the Pudu there are no distinct pouches in this situation; but the skin in the depression between the toes on the dorsal surface of all the feet is bare, and evidently has a free sebaceous secretion. This may be considered the most rudimentary or earliest stage of an interdigital gland.

¶ In the male Pudu there were four.

The feet of the Musk-Deer, as was well observed while the animal was alive, are remarkable, not only for their size and the great development of the outer hoofs, but also for their freedom of motion and capability of being widely extended and closed again, so that it seemed to have the power of grasping projecting rocky points between its four outspread toes—a power which must be of great assistance in steadying itself in its agile bounds among the crags of its native haunts\*.

*Anatomy of the Oral and Cervical Regions.*

The exposed parts of the crowns of the upper canine teeth were 0''·2 long, conical, compressed, curved, directed inwards and somewhat backwards, with their apices truncated†.

The papillæ lining the cheeks are 0''·15 long, conical, very sharp-pointed, becoming smaller behind. In the floor of the mouth a single row of broad, conical, flattened papillæ, with prolonged and very delicate points, extends on each side of the root of the tongue, reaching backwards nearly as far as the last molar tooth, and forwards to within  $\frac{1}{2}$  inch of the incisors. These were broader and flatter in front, and smaller and more slender behind. The longest measure 0''·1 in length. Near the front of the under surface of the attached part of the tongue were a few similar but smaller papillæ, forming a second (upper) line or series.

The palate (fig. 1), narrow in front, gradually widens to the canine teeth, where it is 0''·9 across. Between the canines and molars it contracts to 0''·7. Between the first premolar teeth it is 1''·1 and between the last molar 1''·3. The anterior part (two thirds) is covered with callous, retroverted, imbricated elevations, the hinder sharp margins of which are slightly denticulated. These are placed in a double row, one on each side of the middle line, which they touch but scarcely pass across. In the front of the mouth they are arranged in regular pairs; but after the third those of the left side are placed a little in advance of the corresponding right ridges; and at the narrowest part of the palate, behind the canine teeth, they regularly alternate. The most anterior are narrowest from before backwards and most strongly elevated. They become broader as well as flatter behind the canines. Between the premolars they gradually subside, and are finally lost opposite the commencement of the true molar series. Behind this the palate is perfectly smooth. At its anterior extremity in front of these elevations is a smooth surface, having in the middle line a small somewhat hourglass-shaped prominent pad ·2'' long from before backwards and narrower from side to side, bordered on each side by the opening of the duct to the nasal passage.

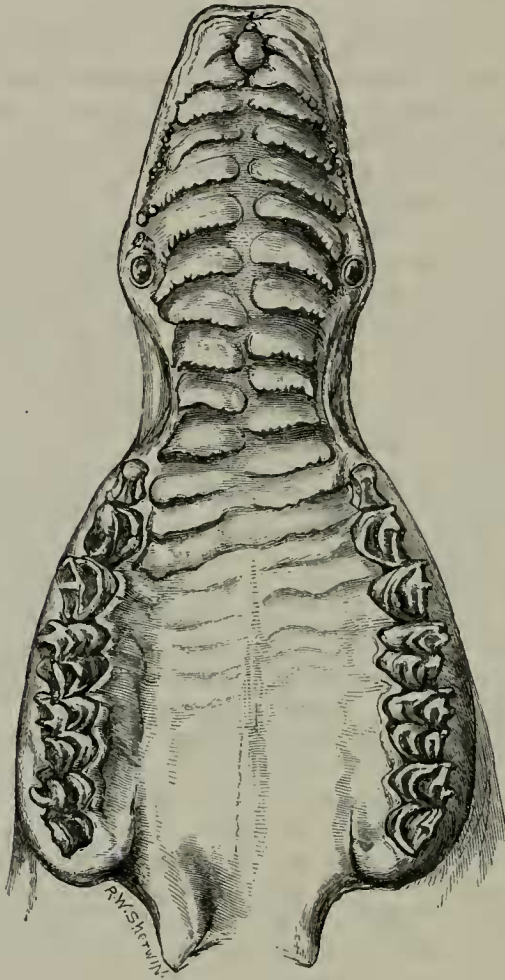
\* My friend Mr. F. Jeffrey Bell has dissected the muscles of the feet, and intends shortly to give to the Society an account of their structure and arrangement.

† In the old male Pudu there were no signs of upper canines—an exception to the general but by no means universal rule in the *Artiodactyles*, that the tusks are developed in inverse ratio to the frontal appendages.



The number of ridges in front of the first premolar is ten on each side; and five or six may be counted behind; but the last are very indistinct. The soft palate extends about an inch behind the last molar, roofing over a portion of the fauces, which is much contracted and tubular, and ends by a straight sharp border.

Fig. 1.



The palate, natural size.

The general form of the palate differs from that of the Roe, and more resembles that of *Tragulus* in the widening opposite the canines, evidently in relation with the great development of these teeth in the male. It also differs from the Roe and approaches *Tragulus* in the ridges being less regularly placed and less strongly imbricated and denticulated. In the last-named animal the ridges, though strongly

marked, are, as in the *Suina*, neither overlapping nor toothed on the edge\*.

The tongue (fig. 2) is  $4\frac{1}{2}$ " long, narrowest ( $0\cdot8$ ) at the middle, rather spatulate, widening to 1" near the front, and terminating by a rounded depressed apex. In the anterior third there is a faint median depressed line. Posteriorly it presents the usual intermolar elevation.

Fig. 2.



Dorsal surface of tongue, natural size.

Minute conical filiform papillæ cover the whole dorsal surface, except quite at the base. These are much larger and further apart on the posterior median elevation than elsewhere. Small, white, circular, fungiform papillæ are pretty regularly scattered over the surface; and posteriorly, close to the lateral margin of the dorsum,

\* In the *Pudu* the ridges of the palate are more developed and more strongly toothed than in *Moschus*, and therefore more typically Cervine, but they are less regular than in the *Roe*.



where the other papillæ are becoming few and small, is on each side a longitudinal row of five rather small circumvallate papillæ, not quite symmetrically disposed and slightly converging posteriorly\*. The tongue is attached in front,  $\frac{3}{4}$  inch behind the incisor teeth, by a soft broad fold of membrane without any distinct frænum.

The parotid gland is large and straggling, composed of loosely connected acini. It extends from the angle of the jaw,  $1\frac{1}{2}$  inch backwards and upwards to the top of the neck behind the ear, a small slender branch projecting forwards and upwards in front of the cartilaginous meatus. The duct leaves the most inferior part of the gland below the angle of the jaw, passes upwards obliquely across the horizontal ramus with the facial artery and vein one inch in front of the angle, and at first following the anterior border of the masseter muscle, then running forwards, enters the mouth quite at the upper part of the cheek opposite the third premolar tooth. An oval patch of buccal glands, nearly an inch from before backwards, is situated in the cheek, around and chiefly below the entrance of the parotid duct.

The submaxillary gland lies immediately below the parotid. It is also very large and with large acini, but of more compact form, being triangular, the shortest side or base of the triangle ( $1''\cdot3$  long) being turned backwards and lying against (for its upper half) the transverse process of the atlas. The apex (distant 2 inches from the middle of the base) lies beneath the horizontal ramus of the jaw. The upper border is in contact with the digastric muscle, the lower border with the sterno-hyoid. The gland lies immediately upon the larynx, with the sterno-thyroid, thyro-hyoid, and the constrictors of the pharynx. A small, detached, oval, glandular piece lay on the upper border of the posterior belly of the digastric muscle, on the right side only. The duct leaves the inner surface of the gland,  $\frac{3}{4}$  inch behind the apex, passes outside the central tendon of the digastric muscle (*i. e.* between it and the ramus of the jaw), then crosses beneath it and runs forward, surrounded by the long sublingual gland (3 inches in length), to open quite at the fore part of the floor of the mouth, beneath one of the before-mentioned papillæ,  $\frac{1}{4}$  of an inch behind the incisor teeth.

The tonsillar glands open by a pair of large distinct orifices, one in front of the other in the usual situation, without any elevation. The œsophagus is lined with very dense epithelium thrown into longitudinal rugæ.

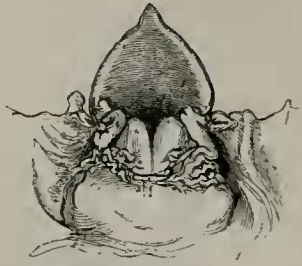
The larynx did not appear to present any thing specially to distinguish it from that of other Deer. The epiglottis (fig. 3) is triangular, with a pointed apex†.

\* The arrangement of the circumvallate papillæ thus agrees with the *Cervidæ*, and differs entirely from that of *Tragulæ* and *Hyomoschus* (see P. Z. S. 1867, p. 955).

The tongue of the Pudu is rather shorter and thicker than that of the Musk-Deer, and not so spatulate at the anterior extremity. The papillæ are similarly arranged; but the fungiform are more conspicuous, especially on the intermolar elevation; and in the middle of the tongue, near the front, they are conical and recurved, though at the apex and sides perfectly circular in outline.

† In the Pudu the epiglottis has a rounded free border. In the Wapiti it is bifid.

Fig. 3.



Epiglottis and opening into larynx, natural size.

The thyroid body is much flattened and oval and of very loose texture, extending from the top of the first tracheal ring to the bottom of the eighth, 0''·8 long and 0''·4 across at the thickest part.

The number of rings in the trachea, above the part where the branch to the upper right lobe of the lung is given off, is 49, between this branch and the bifurcation 11; total 60\*. Some of the rings are single at one side and bifurcated at the other; thus the third ring is single on the left and double on the right side, and the succeeding ring has the opposite arrangement. These double rings have been counted as two in the enumeration given above.

#### *Thoracic Viscera.*

The hinder margin of each lung is entire. The lower lobes are nearly equal in size (the left slightly the largest), of the usual triangular form, being divided off from the rest of the organ by a nearly horizontal fissure, which does not extend quite to the root of the lung behind, though further on the right than the left side. Near the upper part of the inner border of the right lobe, attached by a narrow neck, is the so-called "azygos lobe" (fig. 4, *A*) deeply fissured on its anterior surface.

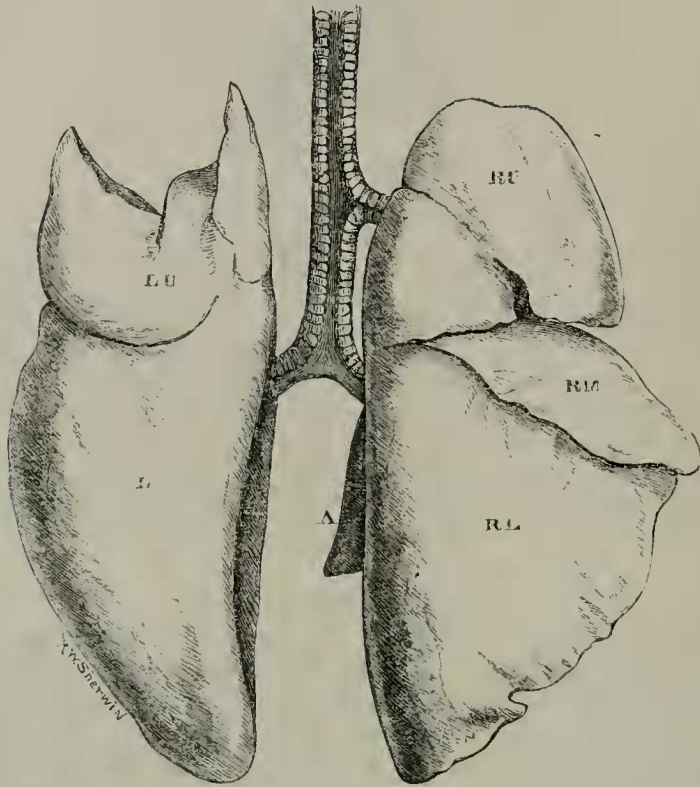
Above the horizontal fissure the arrangement on the two sides is very different. On the right side there are two distinct lobes, the cleft between them extending almost to the root of the lung; the upper one (*RU*) roughly triangular, with the apex upwards and supplied with air by the upper branch of the trachea. It is constricted across its middle into an upper and lower portion. The lower one, or middle right lobe (*RM*), is tongue-shaped, with its apex directed forwards, and while connected at its base with both the upper and lower lobes, it receives its main supply of air from a branch from the principal right bronchus.

The upper portion of the left lung consists of a single lobe (*LU*), but with a short cleft on its anterior border, dividing it partially into a long, narrow, tongue-shaped, inferior portion, with the apex projecting forwards and corresponding to the middle lobe of the right side

\* In the Pudu the number of rings of the trachea is almost exactly the same as in *Moschus*. I counted fifty above and ten below the upper right bronchus.

(though rather smaller), and an upper triangular portion, very much smaller than the right upper lobe\*.

Fig. 4.



The lungs, posterior aspect; half natural size.

*LU*, left upper lobe; *L*, left lower lobe; *RU*, *RM*, and *RL*, right upper, middle, and lower lobes; *A*, azygos lobe.

The heart (fig. 5) is an elongated cone in form, measuring  $2\frac{1}{2}$ " in length,  $1''\cdot9$  from side to side at greatest breadth, and  $1\frac{1}{2}$ " from before backwards when undistended.

A single common anterior arterial trunk is given off from the aorta at its commencement. After a course of  $1''\cdot3$  in length, and having a diameter of  $0''\cdot27$ , this gives off the left brachial (*LB*) from which the left vertebral is derived (*LV*). About a quarter of an inch beyond, the right brachial (*RB*) comes off; and immediately after, the trunk bifurcates into the two common carotids (*RC* and *LC*). The right vertebral (*RV*) is given off from the innominate trunk behind the origin of the right subclavian †.

\* The lungs of the Pudu have the same general arrangement as those of *Moschus*; but the right middle lobe is very little divided from the right lower.

† In the Pudu, the anterior aortic trunk proceeds for  $0''\cdot9$ , then gives off the left brachial, then after a further course of  $0''\cdot5$  gives off the right brachial and

Measurements of the red corpuscles of the blood gave an average diameter of  $\frac{1}{7000}$  of an inch, or about the same as those of the Brocket-Deer (*Cervus nemorivagus*), and considerably larger than those of any *Tragulus* yet examined\*.



The heart and origin of the great arteries, two thirds natural size.

*RB*, right braehial; *RV*, right vertebral; *RC*, right carotid; *LC*, left carotid; *LV*, left vertebral; *LB*, left brachial.

#### *Abdominal and Pelvic Viscera.*

The dissection of the abdominal viscera was somewhat interfered with by the extensive peritonitis which had prevailed shortly before death, all the intestines being glued together by effusion of lymph. On opening the cavity the liver was found to be entirely concealed

continues for a shorter distance before it bifurcates into the carotids. The vertebrals are given off from the brachials before the internal mammary. The arrangement, therefore, is the same in principle as in the Musk.

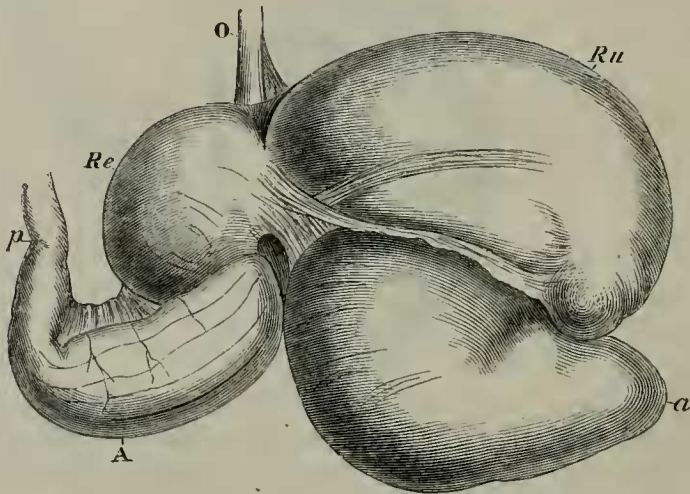
\* See G. Gulliver, "On the size of the Red Corpuscles of the Blood of *Moschus*, *Tragulus*, &c.," P. Z. S. 1870, p. 92.



beneath the cartilages of the right ribs, scarcely passing beyond the middle line. Next appeared a small portion of the abomasus emerging from beneath the edge of the liver and passing across to the left side. Beyond this and occupying all the middle part of the cavity from side to side was the large paunch, extending to within  $4\frac{1}{2}$  inches of the symphysis pubis. The spleen, attached along the left side of the paunch, close to its cardiac orifice, could be seen at the diaphragmatic end of the cavity; and the left kidney projected from behind the edge of the paunch near its hinder end. The portion of the cavity between the paunch and the pubis was filled up superficially by the coils of small intestines. The great omentum descending from the inferior border of the abomasus, extremely thin and delicate and entirely without fat, passed over the right side of the paunch and small intestines to within 2 inches of the symphysis pubis.

The stomach resembles generally the figure given of it by Pallas, except that the psalterium is not so large as there represented. The drawings of the anterior and posterior surface (figs. 6 & 7), taken after it was removed from the body and moderately distended, are

Fig. 6.



Anterior or ventral aspect of the stomach, one fourth natural size.

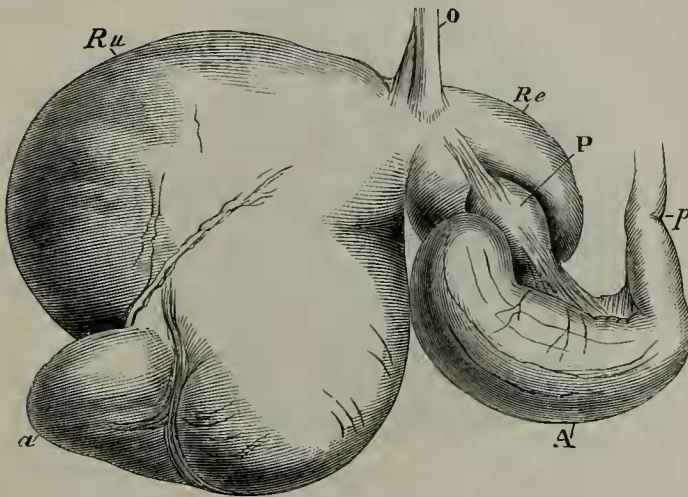
*O*, œsophagus; *Ru*, rumen; *a*, its distal apex; *Re*, reticulum;  
*A*, abomasus; *p*, pylorus.

more correct. The coats of the organ throughout are very thin compared with those of other ruminants which I have examined. How far this might have been an individual peculiarity, or a consequence of the morbidly emaciated state of the animal, I do not know.

The *rumen*, or paunch (*Ru*), is about 8 inches in transverse diameter. It has the usual form, divided by an oblique constriction

into an upper and lower cavity; or perhaps it can be more correctly described as an elongated conical pouch, folded sharply on itself in a sigmoid manner, with constrictions projecting into the interior, at the inner bends of the folds. The lowest constriction, situated on the left border of the organ, is deep, and the projecting pouches above and below it very distinct; and their apices, having different directions, cross each other, the upper one projecting forwards, and the lower or larger one (the fundus or distal end of the whole cavity, figs. 6 & 7, *a*) turning backwards.

Fig. 7.



Posterior or dorsal aspect of the stomach, one fourth natural size.

*O*, oesophagus; *Ru*, rumen; *a*, its apex; *Re*, reticulum; *P*, psalterium; *A*, abomasus; *p*, pylorus.

The villi lining the interior of the rumen are slender and cylindrical and very slightly clavate. They nowhere exceed 0".15 in length, and are largest at the anterior and lower part of the upper pouch. As usual, they are exceedingly short, though not absent, on the edges of the projecting ridges, and over certain points become very fine and sparsely scattered, as on the posterior surface, a little way above and below the constriction, in two rather distinct patches at each place, and more especially at the apex of the lowest or terminal pouch. On the middle of the anterior surface, immediately above the constricting band, where this is subsiding at its left extremity, is a small oval orifice,  $\frac{1}{10}$  inch long, placed transversely, leading into a little (apparently) glandular pouch in the walls of the stomach. The diminished size and concentric arrangement of the villi immediately around this opening evidently show that it is a natural structure.

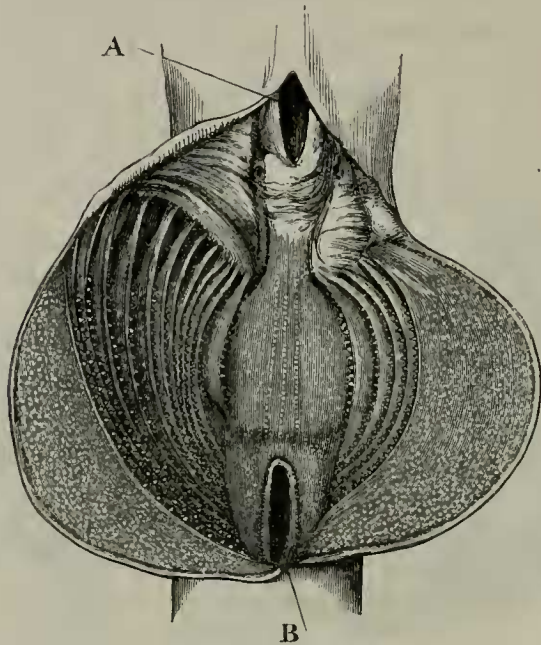
In the *reticulum* (*Re*), the ridges enclosing the polygonal spaces



are extremely shallow; they, as well as the intermediate spaces, are thinly beset with small sharp-pointed papillæ.

The *psalterium* (*P*) is externally 1".7 long and 1" wide, of the usual flattened oval or, more properly, kidney-shaped form. It contains within (fig. 8) nineteen deep crescentic lamellæ, symmetrically

Fig. 8.



The interior of the psalterium, longitudinally opened along the anterior surface, natural size.

*A*, the opening from the œsophagus; *B*, the orifice leading to the abomasus.

arranged, the largest, or those at the centre of the free convex border of the cavity,  $\frac{1}{2}$  an inch in height, their free edges all projecting equally, and, unlike those of Ruminants generally, without any intermediate shorter lamellæ. The lateral surfaces and edges of the lamellæ are thinly covered with small conical tubercles; but the bottom of each interspace is quite bare. This cavity communicates with the next by a distinct circular orifice .3" in diameter\*.

The *abomasus* (figs. 6 & 7 *A*) is of quite the usual form. Its lining membrane presents parallel, narrow, but much elevated, longi-

\* The description of the psalterium of the Musk-Deer by Pallas differs so much from the one given above, that I think it is desirable to insert it here, that the attention of future observers may be directed to the subject.

"*Psalterium* reniforme, chymo sicco suffertum et durum in omnibus inveni. Intus foliatum est, lamellis totius cavi fere latitudinem occupantibus, lunatis, 23 ad 25, præter accessorias plicas exiguas. Laminæ omnes duriusculæ, punctis acutissimis utrinque scabræ, ut tritantes dices, solis cornibus extremis glabræ; cæterum confertim parallelæ, chymo sicco inerustatæ. Inter majores laminas rugæ intercalares, vel lamellulæ accessoriae angustiores."

tudinal ridges or folds, about twelve in number, beginning at the fundus (which projects beyond the opening from the psalterium) and gradually subsiding towards the pylorus\*.

The small intestine was of nearly uniform diameter, .4" inch, when filled with water, and when unravelled 23 feet in length. The colon, when disengaged from its spiral coils, was 13 feet in length, making a total intestinal length of 36 feet, or about thirteen times the length of the animal from snout to root of tail. The colon, commencing at 1 inch in diameter, gradually and slightly increased for the space of 3 feet, then contracted rather suddenly to about half that diameter, and so continued until 2 feet from its termination, where it gradually dilated into a capacious rectum. Its walls throughout were thin and smooth†.

Fig. 9.



The caecum, half natural size.

*I*, ileum; *Co*, colon; *Cm*, apex of caecum; *a*, glandular pouch at commencement of colon.

The caecum (fig. 9) was 6" long and  $\frac{3}{4}$ " in diameter, straight, cylindrical, obtusely pointed at the extremity, with very thin coats. The ileum enters very obliquely and is bound closely to it by a mesenteric

\* The stomach of the Pudu, in general form and in the size of its compartments, both absolute and relative, closely resembles that of the Musk-Deer; but its walls are considerably thicker and its epithelium lining more developed. In the *rumen* the villi are not only longer but thicker and more distinctly clubbed, so that they lie close together, completely concealing the intermediate surface from which they grow, which is not the case in the Musk-Deer. In the *reticulum* the divisions between the spaces are nearer together, more pronounced, and beset with more numerous and coarser papillae. The *psalterium* is almost of exactly the same size as in the Musk-Deer, but differs greatly in structure, inasmuch as the lamellae (as in most Ruminants) are of two kinds, large and small alternating; indeed, in the interspaces are very short ridges, which might be said to constitute a third or smallest order of lamellae. Excluding the latter, the lamellae are altogether of the same number (19) as in the Musk. In accordance with the general character of the lining membrane of the stomach, the papillae covering them are larger and coarser than in the latter. The *abomasus* differs in the greater thickness of its lining membrane, and the irregularity or even reticulating character of the ridges.

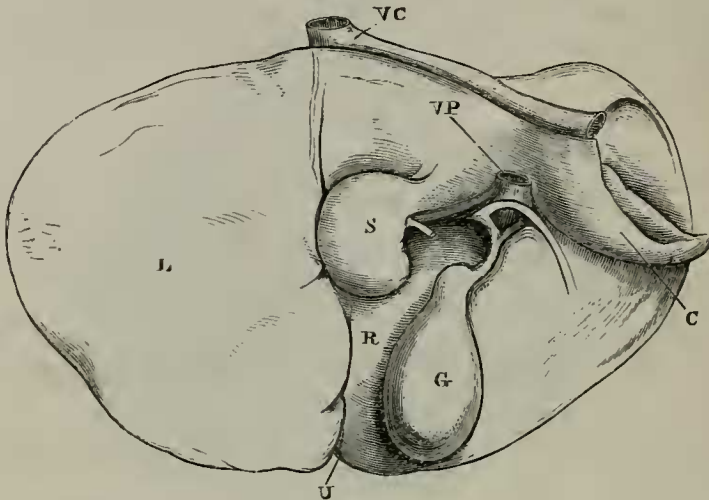
In a *Gazella dorcas* dissected at the same time, the *psalterium* was rather smaller than in the Musk, and its lamellae less developed, being smaller and somewhat irregular, but without any distinct alternation of small and large plates. The bottom of the intermediate surface, as well as the sides and edges of the plates, were covered with pointed papillae.

† The colon of the Pudu forms a very simple helicine coil, composed of two complete circles in one direction and of two in the other.

band to within an inch of its termination. The attached border of the colon immediately beyond the ileo-cæcal valve has an oval dilatation, 0''·8 in length and 0''·6 in breadth, with thickened glandular walls, which Pallas compares to the similar but more marked glandular dilatation in the *Leporidae*, and which, as he says, he has observed in no other ruminant\*.

The pancreas is flat, broad, of irregular outline, and of loose texture.

Fig. 10.



Under surface of liver, half natural size.

L, left lobe; R, right lobe; S, Spigelian lobule; C, caudate lobe; VC, vena cava; VP, vena portæ; G, gall-bladder; U, umbilical fissure.

The liver (fig. 10) presents the usual simple form of that of the Ruminants†. Its general outline is an irregular oval, 6''·2 in extreme breadth and 3''·7 in depth. Its diaphragmatic surface shows only the well-marked umbilical fissure about an inch in depth, and dividing it into right and left segments, of which the former does not greatly exceed the latter in size. Extending from the bottom of the fissure to the posterior or attached border, the delicate suspensory ligament (so often completely atrophied in Ungulates) is distinctly seen. There are no traces of lateral fissures. On the under surface the left lobe is simple, with a thin nearly semicircular free edge. The right is much thickened at its posterior border, and has attached to it very distinct Spigelian and caudate lobes. The former, represented in most Ruminants by a mere smooth tract, has attached to it a flattened quadrate

\* In the Pudu the cæcum is not quite so long and of greater diameter than in *Moschus*, being 5'' in length and 2'' in breadth. It has the usual obtusely ended cylindrical form, and wants the dilatation at the commencement of the colon observed in the Musk.

† See "Lectures on the Comparative Anatomy of the Organs of Digestion of the Mammalia," *Medical Times and Gazette*, Sept. 21st, 1872.

lobule, connected with the rest of the lobe by a narrow neck arising from its right anterior corner and overhanging the portal fissure. The caudate lobe is narrow, tongue-shaped, with its pointed tip extending just beyond the border of the right lobe. There is no cystic fissure on the edge of the lobe, but a very well-marked fossa on its surface, in which lies a wide pyriform gall-bladder, the form of which and the arrangement of the hepatic and cystic ducts are shown in the figure. The common bile-duct, after a course of 2 inches, passes, somewhat dilated, for  $\frac{1}{2}$  inch through the intestinal wall and opens by a wide aperture guarded by a semilunar fold\*.

The spleen is attached to the left side of the paunch, close to the cardiac orifice. It is much flattened,  $3\frac{1}{2}$ " long and 2" broad, obtusely pointed at its upper and truncated at its lower end†.

The kidneys are simple and smooth externally. The right kidney is placed so much in advance of the left that its hinder end is on a level with the anterior end of the former. It is also slightly larger than the left, and more regularly kidney-shaped and flatter. The left is thicker from before backwards, narrow at the front end. The dimensions of the right kidney are—length 1"·85, breadth at middle 1"·2, thickness 0"·95; of the left—length 1·75", breadth at middle 1"·1, thickness from before backwards 1"·1.

The suprarenal bodies are close together, the right being in contact with the corresponding kidney, lying on its inner border between the anterior extremity and the hilus, the left being  $\frac{3}{4}$  inch in advance of the left kidney. Each body is flattened, oval, or somewhat reniform, about 0"·5 long and 0"·3 broad; the left slightly larger than the right‡.

The ovaries are small, flattened, pisiform bodies, 0"·25 in greatest diameter. The vagina and uterus have the usual characters seen in unimpregnated female Ruminants§.

\* The liver of the Pudu is slightly smaller than that of *Moschus*; it is more extended transversely, and differs mainly in the greater size and more quadrate form of the caudate lobe, the total absence of any pedunculated Spigelian lobule (as in most if not all other Deer), and the absence of a gall-bladder. There is no suspensory ligament.

† The spleen of the Pudu is much flattened and of nearly circular outline, though rather narrower and thicker at the upper than the lower end. Its diameter averages 3 inches.

‡ The kidneys and suprarenal bodies of the Pudu closely resemble those of the Musk in form and situation.

§ According to Pallas, the male Musk has Cowper's glands, and a small filiform termination (6 lines in length) to the glans penis.

In the Pudu the vasa deferentia are enlarged and flattened for the last inch of their course, attaining a width of a quarter of an inch. The prostate consists of two nearly globular lobes, each of about the size of peas, and a smaller middle lobe placed at the union of the vasa deferentia. The walls of the "membranous urethra" are very thick. Contrary to what obtains in Deer generally, there is a pair of Cowper's glands with a thick muscular covering, also about the size of peas, but somewhat flattened and triangular in outline. The penis is large and thick, and the glans fleshy and conical, without any terminal prolongation.

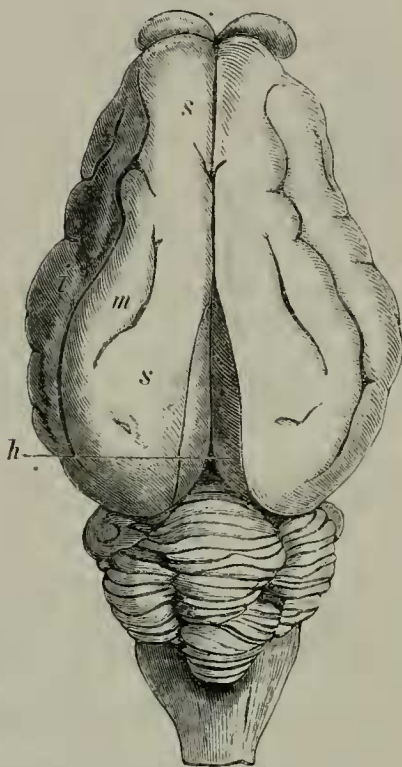
It may be mentioned that in *Hyomoschus*, Cowper's glands are well developed. the penis is long and slender, and, as in Pigs, has a spiral or corkscrew-like termination.



*The Brain.*

The brain presents the usual characters of that of an ordinary Deer (*Cervus mexicanus*, Mus. Roy. Coll. Surg. no. 1328 E a, was the species with which I compared it most closely), but, in accordance with its smaller size, much reduced in complexity of surface indentations. A natural group like the *Cervidæ*, containing animals varying much in dimensions, is well adapted to demonstrate how closely the amount of convolution bears relation to the bulk of the hemisphere, the primitive pattern being exactly the same in all. The

Fig. 11.



Upper surface of brain, natural size.

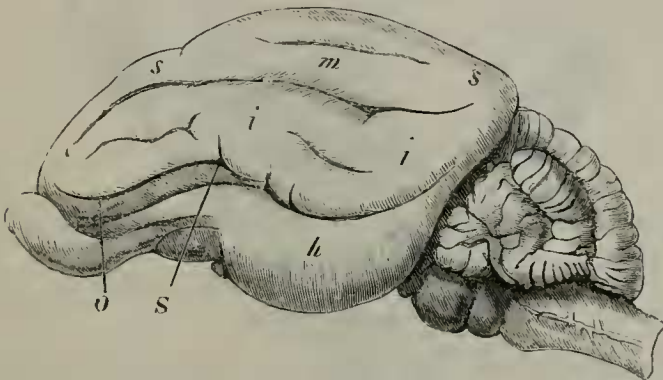
s s, superior external gyrus; m, middle external gyrus; i, inferior external gyrus; h, hippocampal gyrus.

brain of *C. tarandus* (Mus. Roy. Coll. Surg. no. 1328 E) is far more abundantly supplied with secondary surface-windings (even so as very much to obscure the general outline of the pattern) than is that of *C. mexicanus*. The latter and *C. dama* (Leuret & Gratiolet, 'Anat. Comp. du Système Nerveux,' pl. x.) are almost exactly alike. *C. capreolus* (ibid.) is more simple, and *Moschus moschiferus* still more so.

The most obvious division of the external surface of the hemisphere is into three longitudinal tracts. The lowest (*h*), continued from the

olfactory bulb in front, dilates to form the smooth "temporal lobe," and, curving upwards and inwards, appears on the internal surface of the hemisphere, and passes above the corpus callosum to the anterior extremity of the organ. In this part of its course it is bounded above by the "calloso-marginal sulcus" (Huxley). This gyrus I have previously spoken of as "hippocampal," because the hippocampus major is formed by the sulcus on its concave surface\*. Above this, and separated from it by a very distinct horizontal sulcus, is a broad tract (*i*), extending from the front to the back of the brain, of nearly equal width throughout. Rather in front of the middle of this is

Fig. 12.



External surface of brain, natural size.

*s s*, superior external gyrus; *m*, middle external gyrus; *i i*, inferior external gyrus; *h*, hippocampal gyrus; *S*, Sylvian fissure; *O*, supraorbital sulcus.

the very insignificant Sylvian fissure (*S*), anterior to which a longitudinal sulcus (*supraorbital*, *O*) marks off, as in the Carnivora, a narrow strip, the supraorbital gyrus of Leuret, which in *Proteles* appears to be the reflected commencement of the superior gyrus, but in the Deer looks more like a dismemberment of the inferior outer convolution.

The remainder of the outer surface of the hemisphere is occupied by a tract, broad behind and narrow in front (*s m s*), extending the whole length of the hemisphere. In the simpler form of brains of the group this might be considered a single convolution; but already in *Moschus* a longitudinal fissure towards the posterior end separates two tracts, which become so marked in the larger species that Leuret considers them two distinct gyri (*s* and *m*). However this may be, they always become confluent towards the anterior part of the brain.

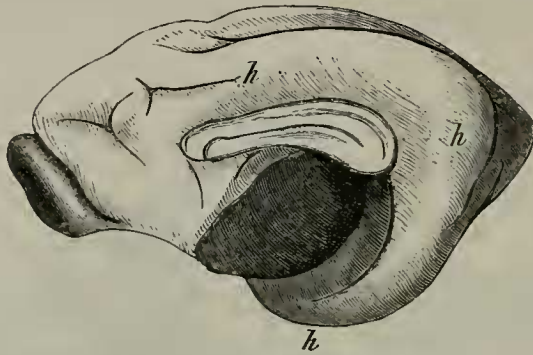
As regards the convolutions, then, the brain of *Moschus* is essentially a simplified (because small) Deer's brain. There is, however, one point of importance in which it differs from the other Deers' brains examined; and that is the very high position of the calloso-marginal sulcus, which in its posterior half becomes visible on the

\* "Anatomy of *Proteles*," P. Z. S. 1869, p. 479.



upper surface of the brain, together with a narrow strip (fig. 11, *h*) of the internal or hippocampal gyrus. In the Mexican Deer the sulcus certainly rises quite to the upper edge of the internal surface of the hemisphere; but neither in this species nor in the Roe (according to Leuret's figure) is any part of the hippocampal gyrus exposed near the middle line. What makes this character interesting is

Fig. 13.



Internal surface of cerebral hemisphere, natural size.

*h*, hippocampal gyrus.

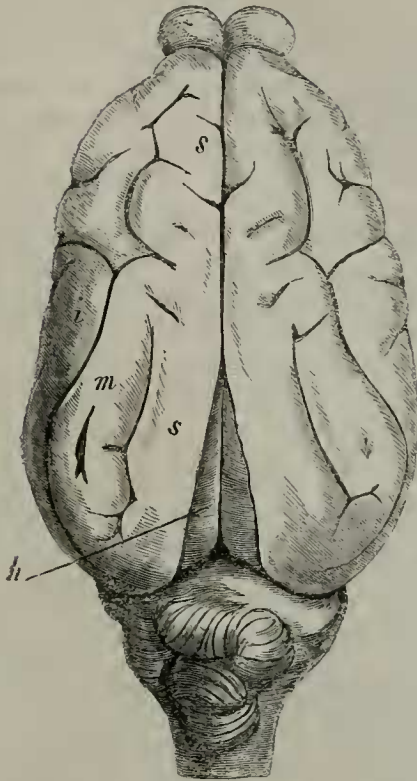
that in *Tragulus* it is present even to a greater degree, the hippocampal gyrus bordering the posterior half of the great longitudinal fissure forming a prominent feature in the upper surface of the brain. In other respects the brain of *Tragulus*, as far as its surface-markings are concerned, is a simplified miniature of that of the *Cervidae*. The inferior external longitudinal convolution is distinctly marked from the superior; but the latter has scarcely a trace of a division into two, though at first sight the abnormal position of the calloso-marginal sulcus might be taken for one. Whether this is any special evidence of affinity between *Moschus* and *Tragulus*, cannot be decided until the brains of other small species of *Cervidae* have been examined. In the mean time, I can only point it out and await future opportunities of investigation. The comparison of cerebral convolutions as evidence of affinity is a subject in which, without very careful or extended research upon ample materials, the investigator is apt to be led astray, but one which, under favourable conditions, may lead to valuable results\*.

\* The opportunity of examining the brain of the Pudu Deer has afforded the means of solving the question stated above. It is slightly larger, both relatively and absolutely, than that of the Musk, as the following dimensions show:—

	<i>Moschus</i> <i>moschiferus</i> ♀	<i>Cervus</i> <i>humilis</i> ♂
Length of skull from front of præmaxillæ to occipital protuberance .....	in. 6.1	in. 5.8
Length of cerebral hemisphere .....	2.1	2.4
Greatest breadth of cerebral hemispheres .....	1.7	1.8

It is chiefly distinguished by the greater breadth of the frontal lobes (see

Fig. 14.



Upper surface of brain of Pudu Deer (*Cervus humilis*), natural size.

Letters as before.

#### The Skeleton.

The skeleton of *Moschus* has been described by A. Milne-Edwards, though somewhat briefly except as regards the skull. I will only add a remark upon the number of the ribs. He says:—"D'après Pallas, le nombre des paires de côtes varierait de 14 à 15; tandis que chez les Cerf leur nombre est ordinairement de 13, bien qu'on trouve (chez le Renne, par exemple) parfois 14." In the skeleton which

fig. 14); the general arrangement of the sulci is the same; but they are somewhat more complex, almost equalling in this respect those of the Roe. It differs, however, from the latter (if Leuret's figure can be trusted) in the greater breadth of the anterior part of the superior gyrus, and especially in the appearance of a considerable-sized strip of the internal or hippocampal gyrus on the upper surface of the hemisphere bordering the hinder part of the great longitudinal fissure, exactly as in the Musk-Deer. This character thus forms no special approximation to the *Tragulina* in the last-named animal, but is probably common to all the smaller *Cervidae*. The chief characteristics of the brain of the Musk, as distinguished from the other members of the family to which it belongs, are the simplicity of the surface-markings and narrowness of the anterior lobes—indications of a lower or more primitive type.

has been so long mounted in the Museum of the College of Surgeons there are certainly 14 ribs ; but in two others presented by Mr. Bryan Hodgson there are but 13, which is the number in the female subject of the present notice. It is curious that if *Moschus* sometimes varies in excess of the number of ribs usual to the *Cervidæ*, *Hydropotes* differs in the opposite direction ; for the fine skeleton of a male of that species lately presented to the Museum by Mr. Swinhoe has but 12 pairs.

*Systematic Position and Affinities of Moschus.*

Although, in consequence of imperfect knowledge or imperfect reasoning upon such knowledge as we possess, a large portion of our present system of zoological classification can only be looked upon as tentative and provisional, there are certain conclusions which we have good reason to believe no future discoveries will ever change, and upon which we can therefore take our stand and say they are questions of fact and not of opinion.

One such is that the Paridigitate Ungulates of Cuvier (the ARTIODACTYLA of Owen, the "Bisulques" of Gervais) form a definite natural group, all the members of which are more nearly related to each other than they are to any other mammals. Of no large group do we know the past history so thoroughly ; and our knowledge of it has enabled us to fill up almost every important link since the middle of the Eocene epoch, and to show the gradual steps by which its different modifications have been brought about\*.

Another fact which I think indisputable is that, by the extinction of the various intermediate forms, four distinct modifications of the original Artiodactyle type have been left at present inhabiting the earth's surface, which are the *Suina* (including the Pigs and Hippopotamus), the *Tylopoda* † (the Camels and Llamas), the *Tragulina* ‡ or Chevrotains, and the true Ruminants (called also *Pecora* and *Cotylophora*).

\* Our present state of knowledge on this subject has been very ably and ingeniously expounded by Dr. W. Kowalevsky in his "Monographie des genres *Anthracotherium*, Cuv., und Versuch einer natürlichen Classification der fossilen Huftiere," Palæontographica, xxii. 1873. An abstract will be found in a paper by the same author "On the Osteology of the *Hypotamidæ*," Proc. Roy. Soc. vol. xxi. p. 147, 1873.

See also W. H. Flower, "On Palæontological Evidence of Gradual Modifications of Animal Forms," Proceedings of the Royal Institution of Great Britain, April 25th, 1873.

† Illiger, 'Prodrromus,' 1811. *Phalangigrada* and *Digitigrada*, proposed subsequently, have no advantage over the earlier name.

‡ The known members of this group, constituted of the genera *Tragulus* and *Hyomoschus*, are so closely allied as to form a single family, which, according to the most convenient rules of zoological nomenclature, would be called *Tragulidæ* ; but I use the above termination as implying that they constitute a zoological division of more than family importance, equivalent, in fact, to the three others mentioned above. Although the French word *Chevrotain* and the Latin *Tragulus* may have had originally nothing to do with these animals, it is very desirable, in default of any better designation, to keep them for their exclusive use, and never for the future to allow such unfortunate expressions as "Pigmy Musk-Deer" to remain to convey false notions of zoological affinities.

Any system of classification which ignores these facts cannot pretend to be founded upon the teaching of nature.

There has scarcely been a more troublesome and obdurate error in zoology than that which, based on the observation of certain comparatively unimportant external characters, placed the *Tragulina* and *Moschus* in one and the same genus\*. It has been troublesome not only as preventing a just conception of the relations of existing Artiodactyles, but also in causing great confusion and hindrance in palæontological researches among the allied forms; and most obdurate, inasmuch as all that has been recently done in advancing our knowledge of both groups has not succeeded in eradicating it, not only from nearly every one of our zoological text-books, either British or continental, but even from works of the highest scientific pretensions.

In the admirable memoir of Adolphe Milne-Edwards already referred to, which contains so much solid information about the Musk-Deer and the *Tragulina*, and in which the distinctions between them are so clearly pointed out, the influence of the old traditions prevailed; and in his final revision of the order of Ruminants (p. 118) the *Tragulidæ* constitute only one of the families of the suborder Unguligrada, the *Moschidæ*, *Cervidæ*, *Antilopidæ*, *Capridæ*, *Bovidæ*, and *Girafidæ* (so far more closely allied to one another) being the others, while the Camels are separated as a distinct suborder, Phalangigrada.

In a later work, however, published by the same eminent zoologist in conjunction with his illustrious father ('Recherches pour servir à l'histoire naturelle des Mammifères,' 1868), in the preliminary sketch of the classification of the Mammals, a complete reformation is made, *Moschus* being included among the *Pecora* or ordinary Ruminants, while the "*Chevrotains proprement dits*" constitute an order apart, called "*Tragulides*," placed between the former and the "*Pachydermes bisulques*."

Whether or not we give the term "order" to these groups† matters less than that we recognize their natural character, and feel satisfied that the wide separation thus made between animals formerly thought to be so closely allied is justified by our increased knowledge of their structure. I will therefore endeavour, more fully than has hitherto been done, to give the reasons upon which this view is based, which will be the first step necessary for defining the position of *Moschus*.

\* *Moschus* and *Tragulus*, previously used as synonyms, were first separated by Dr. J. E. Gray, in 1836 (P. Z. S. vol. iv. p. 63), as sections or subgenera of the genus *Moschus*; but the importance of their distinguishing characters was not recognized, as *Memminna* was made another section of equal rank. Pucheran first proposed to place *Tragulus* in a family apart from *Moschus*, chiefly on account of the different structure of the stomach ("Monographie des espèces du genre Cerf," Compt. Rend. de l'Acad. des Sciences, 1849, t. xxix. p. 773, and Archives du Muséum, 1852, t. vi. p. 285).

† I think myself that this application of the term is hardly consistent with its general use among the other Mammalia, and that "suborder" would be preferable.



\* In the following characters *Moschus* agrees entirely with all the *Pecora* and differs from the *Tragulina*.

1. The placenta is cotyledonous\*, whereas in the *Tragulina* it is diffuse, as in the *Suina* and *Tylopoda*.

2. There is a complete psalterium or third cavity to the stomach.

3. The left brachial artery arises from a common innominate trunk, instead of coming off separately from the aortic arch as in *Tragulina*, *Tylopoda*, and *Suina*†.

4. The odontoid process of the second cervical vertebra is in the form of a crescent hollow above, instead of being a conical tuberosity as in *Tragulina* and *Suina*.

5. The auditory bulla is simple and hollow within, instead of being filled with cancellated tissue as in *Tragulina*, *Tylopoda*, and *Suina*.

6. The outer metacarpal and metatarsal bones are rudimentary, and do not extend the entire length of the middle metacarpal and metatarsals.

7. The distal extremity of the fibula is represented by a distinct malleolar bone of peculiar shape, articulating with the outer surface of the lower end of the tibia‡.

8. The molar and premolar teeth of *Moschus* are truly Cervine, though more compressed throughout the series than in most Deer. In consequence of this, the first upper premolar has the inner crescentic lobe but little developed; but its presence can be distinctly seen in specimens that are not much worn, and there is no tendency to that great disparity of breadth between the two anterior premolars and the true molars seen in the *Tragulina*, whose teeth retain much of the old *Xiphodon* type§.

It is scarcely necessary for the present purpose to enumerate numerous minor osteological characters (many of which are pointed

\* For a description of the placenta of *Moschus*, we are indebted to Pallas (*loc. cit.*).

† The only recorded exception to the ordinary origin of the left brachial artery in the *Pecora* is in the Giraffe, where Prof. Owen found that the arch of the aorta, after distributing the vessels to the heart itself, gives off first a large innominate, which subdivides into the right vertebral artery, the right brachial artery, and the common trunk of the two carotids, secondly the left brachial artery, thirdly the left vertebral artery (*Trans. Zool. Soc. vol. ii. p. 229*). But Joly and Lavocat describe, in the Giraffe dissected by them, a common innominate trunk (or anterior aorta) as in the Ruminants generally, giving off both brachials and carotids ("Recherches sur la Giraffe," *Mém. Soc. d'Hist. Nat. de Strasbourg, t. iii. 1845, p. 103*); and Prof. A. H. Garrod informs me that the same distribution of the great vessels occurred in two specimens which he had examined.

‡ In *Tragulus* the upper part of the fibula is present as a long slender style, but the lower end ankyloses at an early age with the tibia. The latter is the case with *Hyomoschus crassus* and *H. aquaticus*, according to A. Milne-Edwards; but in a perfectly adult specimen of the last-named animal in the Museum of the Royal College of Surgeons, the malleolar bone is still free, though not of the very characteristic form it possesses in all true Ruminants.

§ In all Deer the first upper premolar has three roots, and the crown is formed by an inner and outer crescent. In *Tragulus* this tooth has but two roots, and a simple compressed crown. In *Hyomoschus*, though the crown resembles that of *Tragulus*, the additional inner root is present. In this respect, as in the condition of the fibula, *Hyomoschus* comes nearer to the Deer than does *Tragulus*.

out in Milne-Edwards's monograph) by which the *Tragulina* differ from the *Pecora*, including *Moschus*; but perhaps the absence of a distinct ridge on the lower end of the metapodium and the form of the lower jaw may be mentioned as examples—the coronoid process being much less elevated, not rising prominently above the zygoma, and the posterior and inferior surfaces presenting an even curve, without a distinct projection at the angle. It may, in fact, be taken for granted that, when animals of the same original type have been so far modified as to differ in so many important characters as have been shown above, the closer the scrutiny of their structure, the more differences in details will be revealed\*.

The question of the near affinity of *Moschus* to the *Tragulina* being thus eliminated, I will next proceed to consider its position in the group of which it is really a member.

The *Pecora* or true Ruminants form, as has often been remarked, an extremely homogeneous group, one of the best-defined and closely united of any of the Mammalia. But though the original or common type has never been departed from in essentials, variation has been very active among them within certain limits; and the great difficulty of subdividing them into natural groups (the "despair of zoologists," as Pucheran calls it) arises from the fact that the changes in different organs (feet, skull, frontal appendages, teeth, cutaneous glands, &c.) have proceeded with such apparent irregularity and absence of correlation that the different modifications of these parts are most variously combined in different members of the group. In questions of this kind the absolute certainty of zoological classification referred to above no longer holds, at least in the present state of knowledge, and opinion may be allowed to have sway, and results must be stated with some feeling of doubt and diffidence. It appears, however, extremely probable that the *Pecora* very soon branched into two main types, the *Cervidæ* and the *Bovidæ* (otherwise the antlered and the horned Ruminants), the Giraffe being perhaps an early and since much modified offset of the former—though whether this be the case or whether it be regarded as a third distinct type may be left out of present consideration.

Although by the general consent of all naturalists the two main groups thus indicated are held to be distinct, and although there is no difficulty in separating them by the character of their frontal appendages, it is by no means easy to find further characters universally applicable by which they can be distinguished, and which are necessary in the cases in which such appendages are not developed, as in the animal now under discussion.

It may be said generally that the *Bovidæ* are distinguished from

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while in the form and greater freedom of the inner metacarpal and metatarsal bones it is further removed from them. In both genera the true molars are much less deeply indented by the enamel inflections, and the characteristic "Ruminant" crescent less distinctly defined than in the Deer.

\* Dr. J. Chatin has recently described the muscles of the limbs of *Hyomoschus*, and finds, as might have been anticipated, that they differ much from those of the *Pecora* and rather resemble those of the *Suina* ("Observations sur la Myologie de l'*Hyomoschus*," *Annales des Sciences Naturelles*, 5<sup>e</sup> série, t. xv. 1872, p. 1).



the *Cervidæ* by the absence of canine teeth, by the absence of distinct metacarpals and phalanges to the outer (second and fifth) digits, by the presence of a gall-bladder, by the single lachrymal canal placed within the margin of the orbit, and by the presence of Cowper's glands. But yet, as will be shown presently, it is doubtful if any one of these characters is exclusively characteristic—that is, may not be found in some member of the other groups.

There is still another character of some importance, derived from the form of the molar teeth. Although there is nothing in the general mode of arrangement of the enamel-folds or in the accessory columns absolutely distinctive between the two groups, existing species can generally be distinguished, inasmuch as the Deer are what may be termed "brachyodont," and the *Bovidæ* "hypsodont"\*: *i. e.* the teeth of the former have comparatively short crowns, which, as in most mammals, take their place at once with the neck (or point where the crown and root join) on a level with or a little above the alveolar border, and remain in this position throughout the animal's life; whereas in the other form (the crown being lengthened and the root small) the neck does not come up to the alveolar level until a considerable part of the surface has worn away, and the crown of the tooth thus appears for the greater part of the animal's life partially buried in the socket, and no part of the root is visible. In this form of tooth (which is always most developed in the posterior molars of the permanent series) the constituent columns of the crown are necessarily nearly parallel, whereas in the other they diverge from the neck towards the free or grinding surface of the tooth. In the more completely hypsodont forms, the interstices of the lengthened columnar folds of enamel and dentine are filled up with cementum, which gives stability to the whole organ, and which is entirely or nearly wanting in the short crowned teeth.

The same modifications from low to high crowns without essential alteration of pattern is seen in an even still more marked manner in some of the Perissodactyle Ungulates, where the tooth of a horse bears to that of *Anchitherium* the same relation that that of an ox does to the early Selenodont Artiodactyles.

As the hypsodont tooth is essentially a modification of, and, as it were, an improvement upon, or specialization of, the other, it is but natural to expect that all intermediate forms may be met with; and it is not always easy to decide, especially in old and much-worn teeth, in which group any given example should be classed. Even among the Deer themselves, as Lartet has observed †, the most ancient have very short molars, and the depressions on the grinding-surface are so shallow that the bottom is always visible, while in the *Cervidæ* of the more recent Tertiary periods, and especially the Pleistocene and living species, these same cavities are so deep that, whatever be the state of the dentition, the bottom cannot be seen ‡.

\* Terms first used, I believe, by Mr. Boyd Dawkins.

† *Comptes Rendus*, 1868, t. lxvi. p. 1119.

‡ Some existing Deer, as the *Axis*, are far more hypsodont than the majority of the family; and, on the other hand, many of the Antelopes are far more brachyodont than the more typical *Bovidæ*—Goats, Sheep, and Oxen.

There is, however, little practical difficulty in deciding, by an examination of the molar teeth of any of the existing Ruminants, to which section it belongs; and, judged by this test, *Moschus* is decidedly brachyodont, and thereby resembles the Cervine members of the group, though in some details, as has already been mentioned, it has slight peculiarities of its own.

The best method, however, of testing the claims of *Moschus* to a definite position will be to take *seriatim* all the principal characters in which it shows variation from the average Pecorine type, and consider in which direction they severally tend.

I. The absence of frontal appendages. This is a well-marked external character, but one the significance of which has been much altered by Mr. Swinhoe's discovery of *Hydropotes*, which, although its anatomy is not yet fully known, I think may be safely assumed to be a true Deer. It is certainly less aberrant than *Moschus*\*.

Even before the existence of other Deer without antlers was known, it might have been suspected that such appendages were really only of secondary importance in a natural system of classification, as they occur among existing Deer in such infinite variety of form and size without correlation with other structural modifications; and as, moreover, palæontology teaches us that Deer (*i. e.* animals having all the osteological and dental characters of the group, as *Dremotherium*) abounded before the antlered forms came into being, it is by no means unreasonable to suppose that some of the recent members of the family might retain this primitive character†.

As one or more species of true Deer are without antlers in either sex, as all (*Tarandus* excepted) have none in the female sex, and as, on the other hand, no *Bovidæ* are known without frontal appendages in the male and nearly all have them in both sexes, it follows that a ruminant, like *Moschus*, wanting these parts is so far more likely to belong to the Cervine than to the Bovine section. The absence of antlers is no indication of special relationship to the *Tragulina* any more than it is to the Camels, Pigs, or any of the early forms of the order.

II. Dentition. The brachyodont character of the molar teeth, as lately mentioned, is some evidence in favour of *Moschus* belonging to the Cervine section, but not by itself conclusive; for even if we knew of no existing Bovine animal in this case, it would be quite possible to conceive of some member of the group retaining a character once common to all.

\* The still more recently discovered *Lophotragus nichianus*, Swinhoe (P. Z. S. 1874, p. 452), appears to be another Deer without antlers; but very little is yet known of its structure.

† *Dremotherium* is sometimes placed among the *Tragulidæ*, or rather the artificial group in which those animals as well as *Moschus* were included; but in the majority of its dental and cranial characters it was a true Deer, of course somewhat generalized and in so far approaching the *Tragulina*. *Gelocus* was an older form, and retained the four premolars of the more primitive types. They both appear to belong to the stock from which the *Pecora* are descended after the ancestors of the *Tragulina* had branched off from it. The latter, as will be seen in the tabular view of the classification of the group (p. 189), are the lowest and least-modified of all the existing selenodont Artiodactyles.

The incisors are of rather peculiar form, the central being straight and awl-shaped instead of expanded and diverging, as not only in most Deer and Antelopes, but also, in a still more marked degree, in the *Tragulina*. But the Reindeer, as Sir Victor Brooke lately pointed out\*, has incisors not unlike those of the Musk; and the same or a closely similar form is not uncommon among the *Bovidæ*. This is rather an absence of specialization than a mark of affinity.

The great development of the upper canine teeth of the male is a remarkable characteristic of *Moschus*, and one on which much stress was formerly laid in separating it from the Deer. Most of the latter, however, have canines; and their great size in the Muntjaks forms a considerable approximation to the condition in *Moschus*. But *Hydropotes* offers a crucial test of the value of this character. This singular genus agrees with *Moschus* in the great size of the canines as well as the absence of antlers (in these cases apparently correlated phenomena). If *Moschus* is to be separated from the *Cervidæ* on the strength of these two most striking external characters, *Hydropotes* must go with it, and the family *Moschidæ* will consist of the two genera *Moschus* and *Hydropotes*†—an arrangement which may satisfy some zoologists; but, as shown by Sir Victor Brooke in his description of the skull of *Hydropotes*, these animals differ greatly in many important respects; in fact, in the form of the base of the cranium, they are as widely removed from each other as are any of the true Deer,—*Moschus*, with its small rugged auditory bulla, resembling the Muntjak and the Roe; while *Hydropotes* has the same part smooth and inflated even in a greater degree than the *Axis* and *Hog-Deer*, and more resembling some of the Antelopes. The question of the affinity of these two forms will receive further elucidation when the visceral anatomy of *Hydropotes* is known; but there is at present but little reason for supposing them nearly related.

As it is a very characteristic feature in the *Bovidæ* to have entirely lost the upper canine teeth (very few indeed possessing any, and these always very rudimentary), their presence on such a large scale in *Moschus* is further corroboration to the evidence derived from the molars that it is not intimately allied to that family.

On the other hand, little weight can be attached to this character as showing any very near affinity to the *Tragulina*. The excessive growth of a particular tooth is an instance of specialization, and occurs so often in forms so remotely allied to each other as *Machairodus*, *Trichechus*, &c., that it can only be taken as evidence of relationship between animals otherwise very nearly akin. In the present case it is probably adaptive, and follows the general tendency among all Artiodactyles, Suine as well as Ruminant, to possess either tusk-like canines or frontal appendages, these being, with some notable exceptions, complementary to each other in development. All the early Artiodactyles had canines, at first of moderate proportions; but it was not long before the tusks became immensely developed in the

\* "On *Hydropotes inermis* and its Cranial Characters as compared with those of *Moschus moschiferus*," P. Z. S. 1872, p. 522.

† As in Dr. Gray's 'Hand-list of Ruminants in the British Museum,' 1872.



males of many species, as *Amphitragulus* and *Dremotherium*. These, after a time, became generally superseded by horns or antlers; but they have either continued from those times or have been independently developed by the agency of similar causes in *Hydropotes* and in *Moschus*, and to a less extent in *Cervulus*, *Tragulus*, and *Hyomoschus*. The latter supposition seems more likely, as when closely examined the canines of *Moschus* and *Tragulus* will be seen to differ much in form and direction. The former are rounded and the latter concave on the external surface; the former tend to approach each other as they grow downwards, the latter to diverge and turn backwards\*. The canines of the Musk seem at first sight to differ from those of other Deer in having persistent pulps; but this is only a question of degree. In old Musks, as in old Muntjaks and *Hydropotes*, the base of the tooth becomes closed, as specimens in the Museum of the College of Surgeons show; but this takes place at a relatively later age.

III. The special characters of the feet are:—(1) the navicular and cuboid united together, (2) the ectocuneiform free, (3) the outer metatarsals entirely absent, (4) the lower extremity of the outer metacarpals fairly developed, (5) well-developed phalanges to the outer toes on all extremities.

The first is common to all the *Pecora* and *Tragulina*, but separates them from the *Tylopoda* and *Suina*. The second is found in all *Pecora* except the Muntjaks and the Pudu, which, in the union of these bones, exhibit a nearer approach to the Chevrotains than does *Moschus*. The third character is common to all the *Pecora* †, and separates them from the *Tragulina*. The fourth *Moschus* shares in common with *Alces*, *Rangifer*, *Hydropotes*, *Capreolus*, *Coassus*, *Cariacus*, and *Pudu*, but not with the other Deer or any of the remaining *Pecora* ‡. The fifth is found in all the *Cervidæ* except *Cervulus*, but not (or only in a comparatively rudimentary condition) in any of the other *Pecora*.

The evidence from the feet, then, is decidedly in favour of the affinity of *Moschus* with the *Cervidæ*; for in that group alone is their exact counterpart to be found.

IV. A very constant distinction in the skeletons of the *Bovidæ* and the *Cervidæ* (excluding *Moschus*) is to be found in the orifice of the lachrymal canal. In nearly all the former this is single and situated just within the anterior margin of the orbit; in the latter there are two openings, one above the other (the upper one situated just upon, and the lower one rather anterior to, the margin of the orbit), and there is generally a bony tubercle between them; the two canals very soon join together. Professor A. Milne-Edwards, to whose excellent observations on this group of animals I am indebted for my first knowledge of this useful character§, mentions certain exceptions; but on a closer examination of these, I find

\* Milne-Edwards, *op. cit.* p. 50.

† If ever present, they are excessively rudimentary.

‡ See Sir Victor Brooke, P. Z. S. 1874, p. 36.

§ Though pointed out in Cuvier's 'Leçons d'Anatomie Comparée,' t. ii. (1837).



that his rule is even more absolute than he himself supposed it to be\*.

*Hydropotes* exactly follows the other Deer in this respect, while *Moschus* entirely differs from them and agrees with the *Bovidæ*. But it is not only the *Bovidæ* but also the *Tragulina*, the *Tylopoda*, and probably all the primitive Artiodactyles † that *Moschus* resembles in this character; therefore it is only evidence of generalization or the retention of an original character, not of special affinity to either one of the other groups which possess it. It is a very singular circumstance, and not easily explained, that the conformation of the lachrymal canals, which has just been mentioned as a special character of the typical *Cervidæ*, also appears in the modern Pigs.

V. The presence of a gall-bladder. This, like the last, is obviously the retention of a general character, as the presence of this organ is the rule in all Artiodactyles excepting the Deer, the Giraffe (where it has occasionally been found), the Camels, and the Peccaries. More accurate and extended observations, however, are required as to its presence or absence; for, at least in those orders (as the Artiodactyles and the Rodents) in which it may or may not be present in nearly allied forms, it seems to be a somewhat variable character even in the same species‡.

The presence of a pedunculated Spigelian lobule to the liver must

\* Speaking of *Moschus*, Milne-Edwards says:—"Le trou lacrymal est unique, situé à la partie inférieure de l'os du même nom en dedans du bord orbitaire, disposition qui ne se voit qu'exceptionnellement chez les Cerfs, mais qui existe d'ordinaire dans le groupe des Antilopes," adding in a note "Chez le Cerf Duvaucel, on ne compte également qu'un seul trou lacrymal, mais chez presque toutes les autres espèces du même genre, il en existe deux, l'un au-dessus de l'autre sur le bord même de l'orbite ou plutôt en dehors. Chez le Muntjac, on trouve trois trous lacrymaux. Le Gnou et le Guib [as mentioned in the 'Leçons d'Anatomie Comparée,' 2nd edit. t. ii. p. 495] sont des exceptions à cette règle, leurs trous lacrymaux sont au nombre de deux de chaque côté." (*Op. cit.* p. 17.)

With reference to the first exception, in a series of skulls of *Cervus duvaucelli* in the British Museum I find the lachrymal canal double and conforming in every way to the ordinary Cervine type. In the Muntjak the third or lowest foramen on the anterior margin of the orbit is not an opening into the lachrymal canal but an antero-posterior perforation of the wall of the orbit, passing from the orbit into the antorbital fossa, and probably for the passage of a vessel or nerve. The true lachrymal orifices are like those of other Deer. In the Gnu the second or lower foramen, as the lowest in the Muntjak, has nothing to do with the lachrymal canal, but is only a perforation of the prominent anterior edge of the orbit, represented by a notch in many other allied forms. The Guib (*Tragelaphus scriptus*) and its immediate allies *T. deevula* and *T. sylvaticus*, and the Éland (*Oreos canna*), however, are real exceptions; and there is another in the curiously aberrant Prongbuck (*Antilocapra*), which possesses the Cervine character of a double orifice to the lachrymal canal (though not placed quite so externally as in the Deer), in addition to others pointed out by Dr. Murie (P. Z. S. 1870, p. 334); yet this animal has most strongly marked hypsodont molars.

† This is certainly the case with *Cenotherium*, *Xiphodon*, *Hyopotamus*, and all the Eocene Artiodactyles which I have examined.

‡ As is well known, Dr. Crisp (P. Z. S. 1862, p. 136) has recorded the presence of a gall-bladder in three specimens of the Axis and in one of the American Deer (*Cervus superciliosus*) and its absence in eight species of the *Bovidæ* examined by him.

also be noticed, and perhaps accounted for in the same manner; but until the livers of all other species of Deer have been examined, its significance cannot be properly estimated.

VI. In the same category may be placed the presence of Cowper's glands, organs generally absent in the Deer and present in all the other Artiodactyla. But although the examination into this question has not yet been very searching, exceptions have already been found. Their presence in the Pudu has been noted above; and their absence in the Prongbuck (*Antilocapra*), an animal which though aberrant I cannot but place among the Bovine section of the group, has been recorded by Dr. Murie in his valuable description of the anatomy of that animal\*.

Together with the absence of Cowper's glands, the Deer have a form of penis unknown in other Artiodactyles, and to which *Moschus* does not quite conform; but closer investigations are required before the value of this character can be ascertained.

VII. The cutaneous glands. Some importance as a taxonomic character has been attached by zoologists to the abdominal odoriferous gland for which the Musk-Deer is so well known. This has been given, for instance, as one of the family characters by which *Moschus* has been separated from the Deer on the one hand and the Chevrotains on the other. But its importance has been overrated, from the supposition that it was a structure *sui generis* instead of only one of the numerous modifications of specialized patches of involuted integument found so universally throughout the vertebrate animals, probably always for a similar purpose at present not perfectly understood, but evidently connected with the discovery and recognition of the presence of individuals of the same species in the neighbourhood. Such glandular patches, either of the skin extended in its usual manner over the surface, or more or less involuted so as to produce a pouch in which the secretion may be retained for a time and its effect thus intensified, are abundantly developed and most variously located in the Artiodactyla—as below the lower jaw in the Chevrotains, on the forehead in the Muntjaks, behind the ear in the Chamois, below the ear in the Prongbuck, in front of the eye (the crumen) in a vast number of species, on the middle of the back in the Peccaries, beneath the tail in Goats, within the edge of the prepuce in the Pigs, some Antelopes, and *Moschus*, in the inguinal region in many Antelopes, on the outside of the metatarsus in most Deer, between the toes in so many species; and their presence or absence, though extremely interesting to observe in each species, especially with a hope to discover more of their function, is not so constantly correlated with other characters as to enable us to make use of them in classification otherwise than in distinguishing very minor groups. There are, in fact, few parts of the organization so variable and readily modified †.

\* P. Z. S. 1870, p. 334.

† Although the first commencement of the modifications of portions of the external covering for the formation of special secretions may be at present difficult to understand, the principal of natural selection will readily

The absence of antorbital glands (generally indicated in the skeleton by the flatness of the facial surface of the lachrymal bone) is a general character of the older members of the order, retained in some few Deer, many of the *Bovidae*, the Giraffe, and all *Tragulina*, *Tylopoda*, and *Suina*. The same is probably the case with the interdental glands, while the great development of the preputial gland is a specialization of the genus *Moschus*.

VIII. The brain of the Musk, in its smallness, simplicity of surface-markings, and narrowness of the anterior part, indicates a low type of the group. It is inferior in these respects to the existing Deer, and still more to the Antelopes of corresponding size.

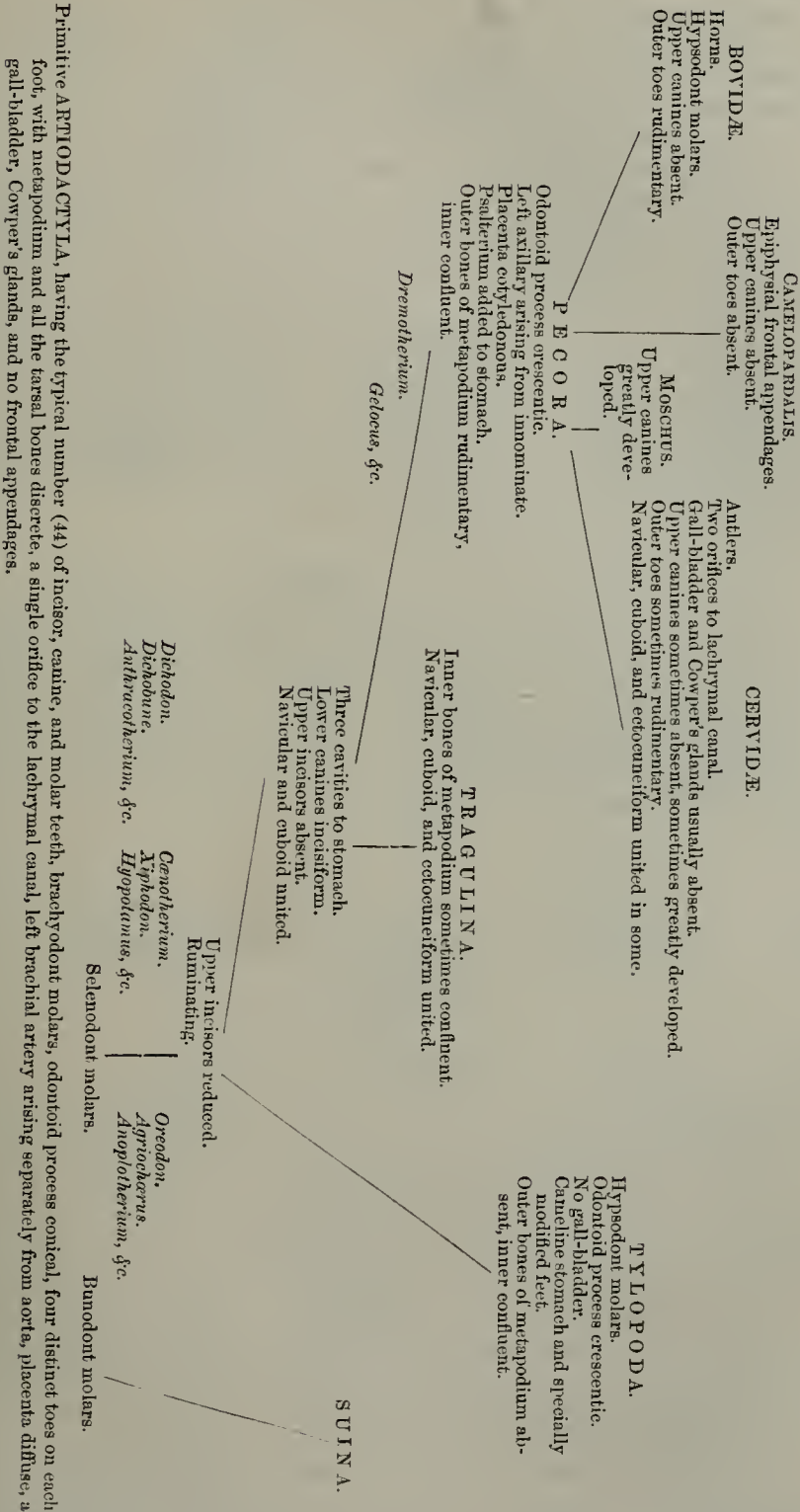
IX. The peculiar construction of the psalterium probably also indicates a simple or low type of the group.

X. I am not quite sure whether it is safe to put any reliance upon the character of the hair of the Musk, which is rather an exaggeration of that found in most Deer. But Antelopes such as *Antilocapra*, and especially *Oreotragus saltatrix*, show a very similar structure in their external covering. The fact of the young Musks being spotted (a character so nearly universal in the Deer, and not known in any of the other groups) may be some indication of Cervine affinity.

To sum up the position of *Moschus*, it appears to me to be an animal belonging to the stock which remained of the selenodont (or crescentic-toothed) Artiodactyles after the *Tylopoda* and the *Tragulina* had been thrown off, and which, by continued modifications of the placenta, of the stomach, and other parts, produced the *Pecora*. Of this stock it is a low and little-specialized form, not having the characteristic peculiarities of either the *Bovidae*, the *Giraffidae*, or the *Cervidae*, being probably descended from the stock before either of those forms was well established, and having undergone comparatively little modification, though on the whole its affinities are nearest to the last-named group. I look upon it as, in the totality of its organization, an undeveloped Deer—an animal which in most points has ceased to progress with the rest of the group, while in some few it has taken a special line of advance of its own. Its position will perhaps be better understood by reference to the annexed table, in which I have endeavoured to show, only of course in a provisional manner, the order in which the principal modifications of the primitive Artiodactyle type have been brought about. The names of some of the best-known extinct forms are inserted to indicate their position only approximately; in the absence of knowledge of their visceral anatomy and unfortunately of much of their osteology, greater certainty cannot be attained. The primary division of the order into Selenodonts, or those having a crescentic arrangement of the projections on their molar teeth, and Bunodonts, or those with only

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explain how such organs can become fixed and gradually increase in development in any species. If the function suggested above be the correct one, such individuals as by the intensity and peculiarity of their scent had greater power of attracting the opposite sex would certainly be those most likely to leave descendants to inherit and in their turn propagate the modification.





simple tubercles, which I believe is a perfectly natural one, was made by W. Kowalevsky; but the names were suggested to him by Prof. Owen, to whom this department of zoology owes so much. The modifications of the Buonodont forms, being beside the purpose of the present communication, have not been followed out.

Finally, it may be asked what place must be assigned to the Musk-Deer in our necessarily imperfect and artificial method of expressing the relationship of living beings? Should the genus *Moschus* be described as constituting a distinct family, *Moschidæ*? As I apprehend the value of the term "family," I think it should not. The characters which absolutely separate it from all the recognized *Cervidæ*, if *Hydropotes* is included among them, are very trifling; and to include *Hydropotes* with *Moschus* in one family, and leave all the other *Cervidæ* in another, appears to be a violation of natural affinities. It therefore appears most expedient to include them both as distinct generic modifications of the great family *Cervidæ*, recognizing of course that though a convenient it is not an absolutely perfect method of expressing their position in nature.

*Note to the tabular view of the Classification of Artiodactyla.*

The form of the odontoid process in the *Tylopoda* might lead to the idea that they were segregated from the Ruminant stock after the *Tragulina* had been given off; but as it is also found in the horse, it is probably adaptive, as are the hypsodont molars. The union of the inner, and loss of the outer, bones of the metapodium is also a character not significant of very close relationship to the *Pecora*, as the tendency to this modification begins in the earliest period of the history of the group with which we are acquainted, as in *Anoplotherium*, and crops out even in some of the buonodonts, as the Peccaries.

2. On some new Species of *Erigone*.—Part I.  
By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S.

[Received February 26, 1875.]

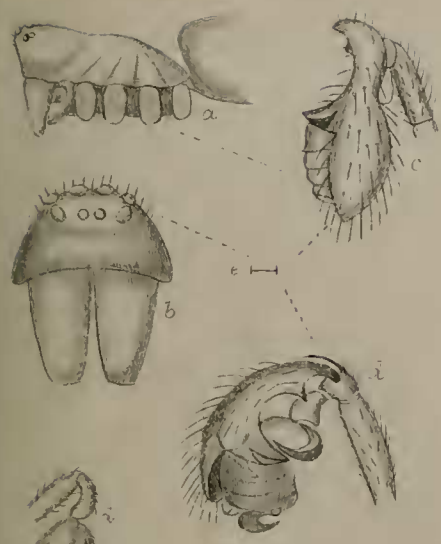
(Plates XXVII.—XXIX.)

The Spiders described in the following pages are, with one exception (*Erigone consimilis*, p. 192), a portion of a fine collection received at various times during the past three or four years from my kind friend, Monsieur Eugène Simon of Paris. The greater part are European, and were found by M. Simon himself in France, Corsica, Sicily, and Spain; several, however, are from Morocco and Algiers.

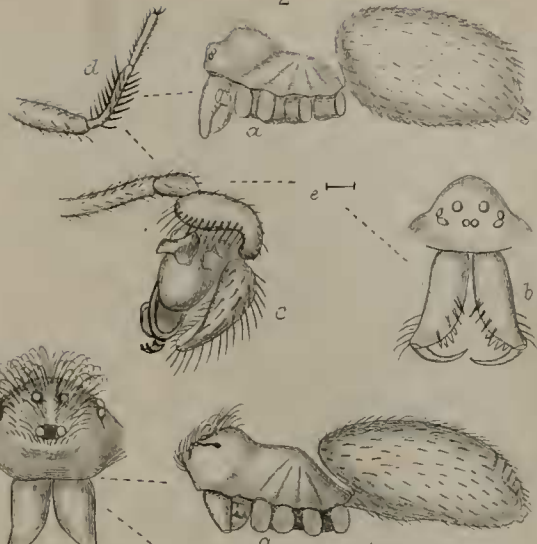
The twenty-four new species now selected for description from M. Simon's collection all (except one) belong to the group comprised in Mr. Blackwall's genus *Walckenaëra*; in addition to these, nine others new to science (belonging to the genus *Neriene* of the same author) remain yet to be described, while the collection also contained examples of forty-four known species.

Rich as the genus *Erigone* is at present in species, it is probable

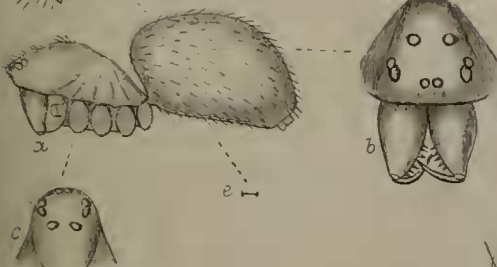
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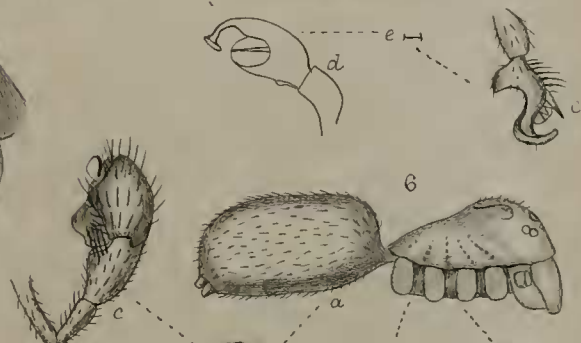
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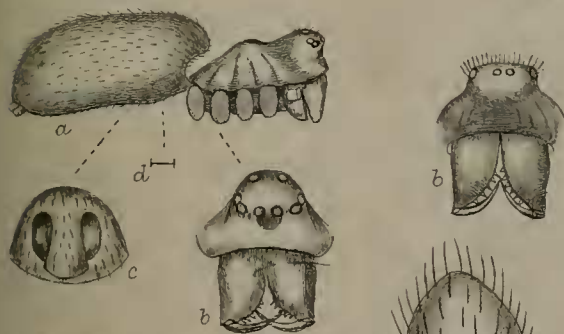
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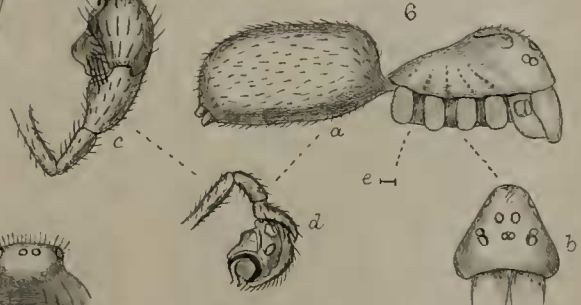
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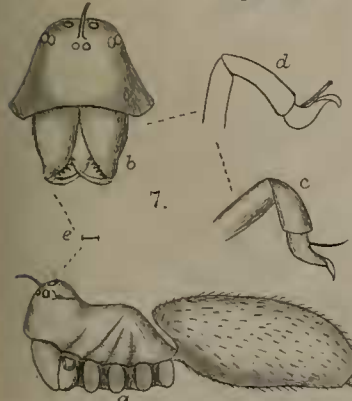
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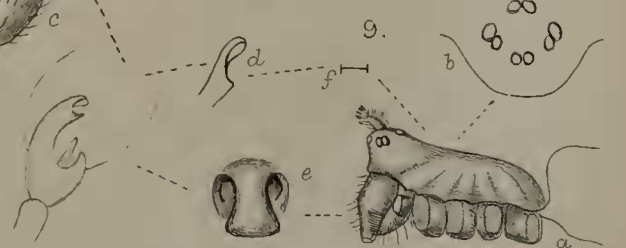
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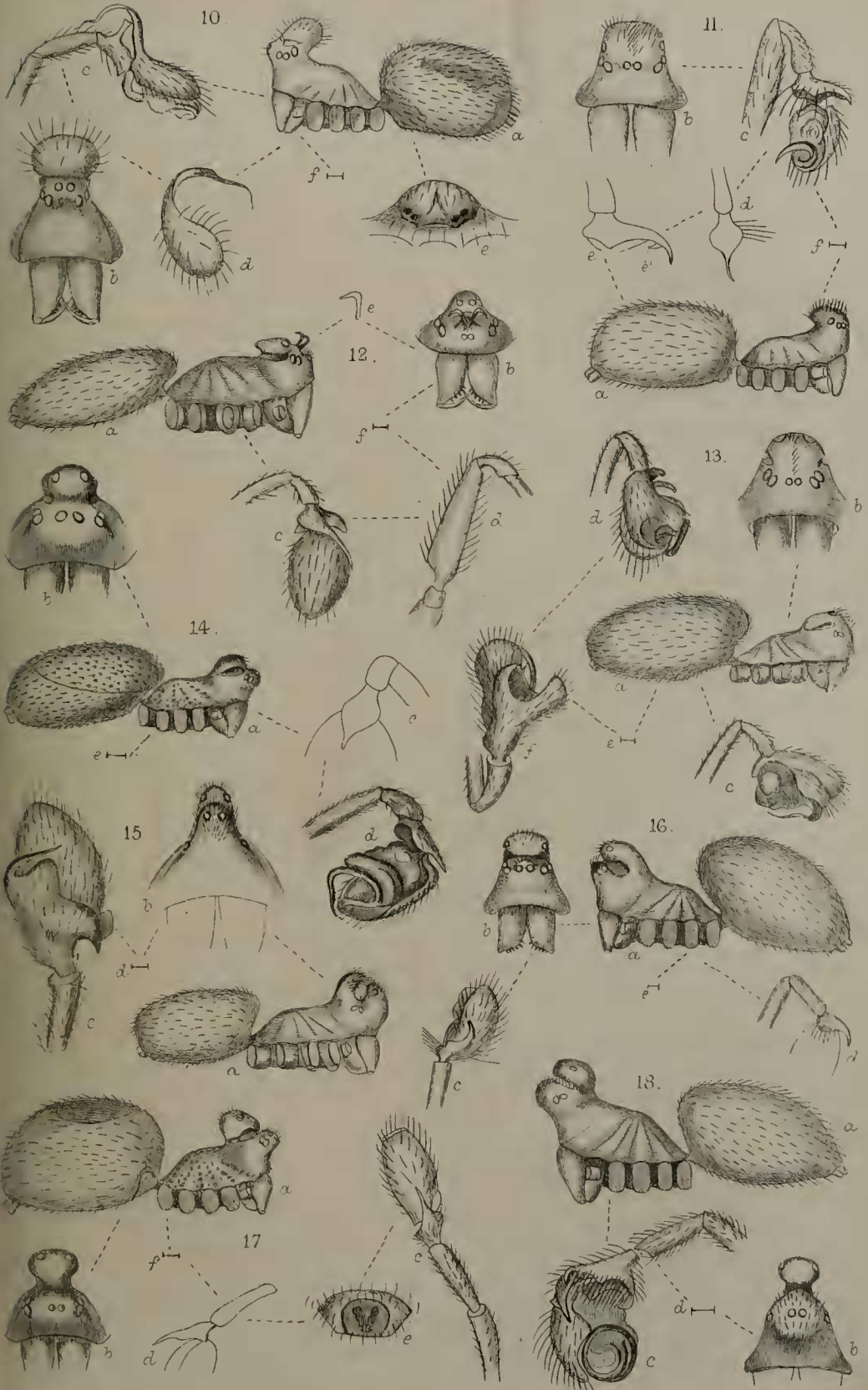
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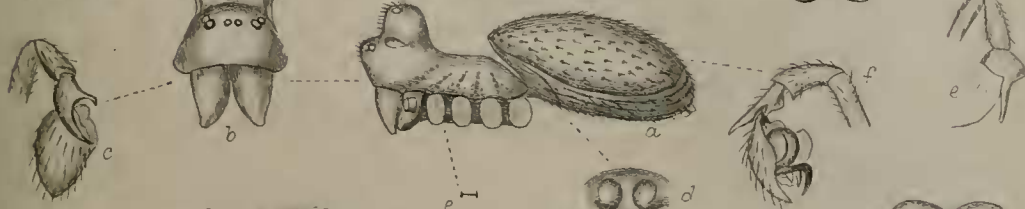




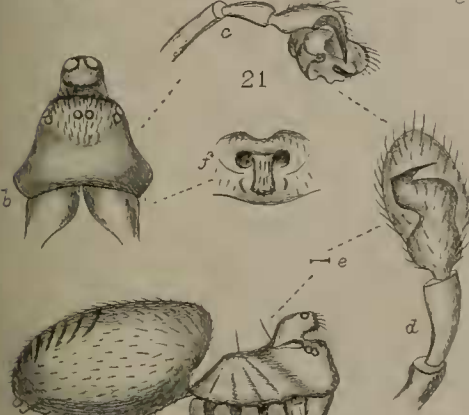
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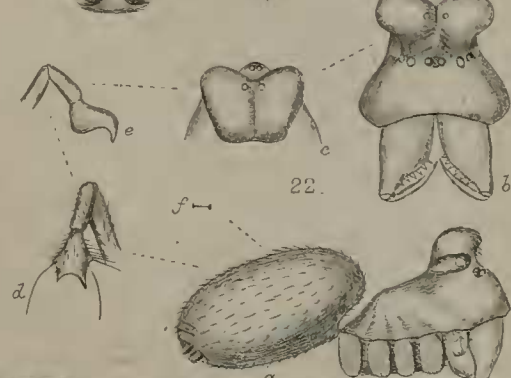
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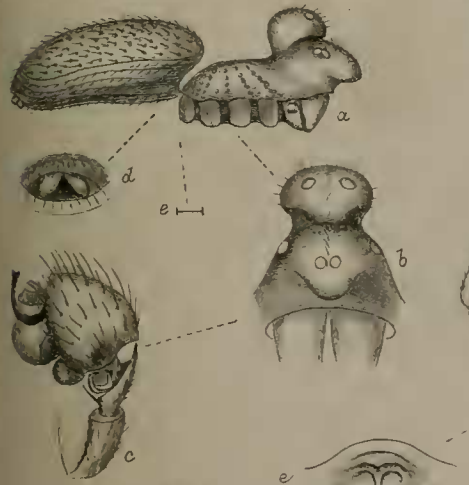
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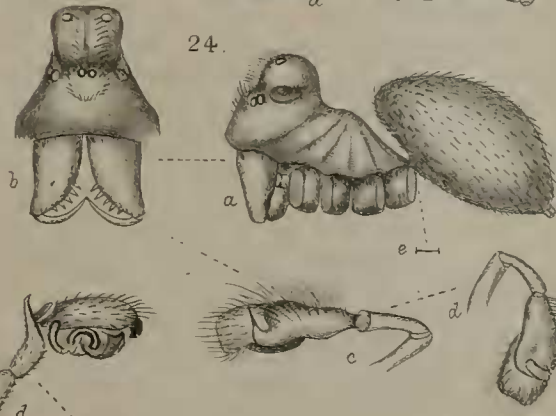
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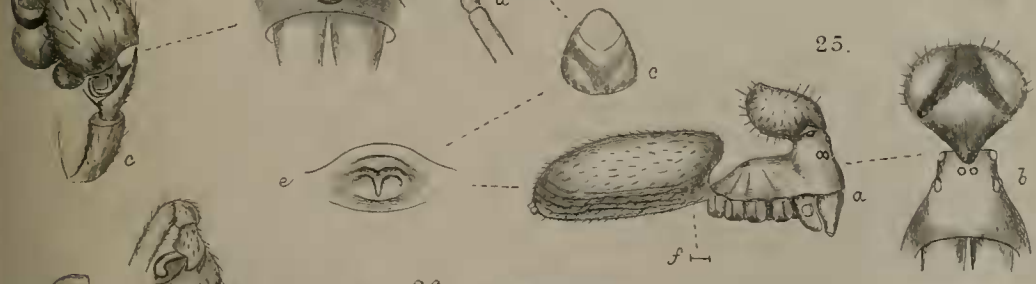
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26.



C. P. Cambridge del.  
A. T. Hollick lith.

NEW SPECIES OF ERIGONE

W. West & Co. imp.



that very many more remain to be discovered; and the number of curious and distinct conformations of the caput in the male would seem to be almost without limit. It is probably from the several distinct types of this portion of the structure that it will be found some day most practicable to break up the genus into subordinate groups. While, however, the males may be thus grouped, it appears as yet that the females do not follow the same laws of development in respect of the caput, the structure of that part in the female affording frequently no evidence at all of affinity to the male; hence arises the great difficulty, in very many cases, of deciding to which species the females belong; for it often happens that any one of several females may, as far as structure and colour are concerned, be, with equal propriety, relegated to one male. It is not difficult to distinguish the different females among themselves, since each ordinarily possesses strong specific characters; but their general similarity of form makes it exceedingly difficult to propose any method of grouping them.

ERIGONE RETROVERSA, sp. n. (Plate XXVII. fig. 1.)

Adult male, length  $1\frac{1}{2}$  line.

The *cephalothorax* of this very distinct species is of a dull greenish olive colour and of a rather flattened form, the caput and thorax being nearly on the same level, and the normal grooves and indentations indistinct; the height of the clypeus is not quite two thirds of that of the facial space.

The *eyes* are of moderate size and not very unequal in their relative magnitude; they are seated on the fore part of the caput, which projects slightly forwards, in two transverse rows or four pairs somewhat closely grouped; those of the hinder row are about equidistant from each other, those of the fore central pair, which are the smallest of the eight, are rather nearer together than each is to the fore lateral eye on its side.

The *legs* are of a pale yellow colour, the tibiæ of the first and second pairs being dark olive-brown; they are long and strong, furnished with hairs and a few nearly erect slender spine-like bristles.

The *palpi* are short: the cubital and radial joints very short, but of about equal length; the former is somewhat subangularly prominent on its upperside, where it has a strong, black, tapering bristle; a similar but longer and stronger bristle springs from the upperside of the radial joint, which enlarges at its extremity, but has no prominences or projections: the digital joint is of a dark yellowish brown colour, and has its hinder extremity produced into a long, very strong and slightly tapering projection, which curves back towards the cubital joint; the length of this produced part is equal to that of the joint, and its extremity is somewhat squarely truncated and of a blackish colour; near the extremity, on its outer edge, is a strong, black, sharp pointed corneous prominence; and below this again the digital joint has a large curviangular prominent lobe; the palpal organs are well-developed, prominent, and complex.

The *falces* are long, strong, and a little inclined backwards; they are similar in colour to the cephalothorax.



The *maxillæ* and *labium* are normal and similar in colour to the *falces*.

The *sternum* is of the ordinary heart-shape, convex, glossy, and darker in colour than the *maxillæ*.

The *abdomen* is black, tinged with olive-green, glossy, hairy, and of an elongate-oval form.

An adult male of this Spider was received for examination in 1872 from M. Eugène Simon, by whom it was found near Paris. It is a most striking and remarkable species, allied to, but very distinct from, *Neriene cornigera* (Bl.).

ERIGONE CONSIMILIS, sp. n. (Plate XXVII. fig. 2.)

Adult male, length  $1\frac{1}{2}$  line.

This Spider is closely allied, both in general form, colour, and size, to *E. uncana* (Cambr.); but it may readily be distinguished, *first*, by the greater gibbosity of the occiput; *secondly*, by the length and divergence of the *falces*, which are also rather weak, and, besides the usual teeth on the inner side near their extremities, are furnished with several short, sharp, tooth-like spines towards their inner margin in front; *thirdly*, by the metatarsi of the first pair of legs being bent sharply downwards at their hinder extremity (the remainder being curved upwards), and, in addition to hairs, furnished with strongish spines chiefly on the fore half of their inner side; *fourthly*, by the radial joint of the palpus, while preserving the same general form, being stronger, *very obtuse* at its extremity, and of a deep shining chestnut-brown colour, approaching to black; the palpal organs also differ in structure.

The *cephalothorax* and other fore parts are of a dark yellow-brown colour, the legs being paler.

The *abdomen* is of a dull but glossy brown, tinged with yellow and thinly clothed with hairs, showing also in spirit of wine some metallic greenish reflections; on the hinder half of the upperside is a series of pale transverse curved lines which decrease in length towards the spinners.

A single example is in the British Museum collection; its locality is uncertain, but it is believed to be European.

ERIGONE LONGIUSCULA, sp. n. (Plate XXVII. fig. 3.)

Adult male, length  $\frac{3}{4}$  line.

The whole of the fore part of this Spider is of a bright orange-yellow colour, the palpi being rather paler and the abdomen jet-black. The *cephalothorax* is of the ordinary general form; the occiput is the most elevated part, whence it slopes to the clypeus, the caput being broad at its fore part but rather flattish, though with the sides tolerably well rounded. The ocular area is large and occupies the fore half of the upperside of the caput, and is furnished with short bristly hairs; the normal indentations are but faintly marked; at the hinder extremity of the occiput is a small dusky brown patch, from which several short indistinct lines of the same colour radiate. The whole surface of the *cephalothorax* is glossy.

The *eyes* are on black spots disposed in the usual four pairs, and forming an area rather broader than long; they are of moderate size and, relatively, do not differ to any very great extent; those of the hinder pair are separated from each other by rather less than two diameters; those of each lateral pair are contiguous to each other and are seated on a slight tubercle, the hind lateral eye being rather more than a diameter's distance from the eye nearest to it of the hinder pair; the fore laterals are the largest of the eight, and each is rather more than a diameter's distance from the eye nearest to it of the foremost pair; the eyes of this last pair are smallest of the eight, dark-coloured, but not quite contiguous to each other; the rest are pearly white.

The *legs* are moderate in length and strength; their relative length appeared to be 4, 1, 2, 3; there is, however, but little difference between those of the first and fourth pairs; they are furnished with hairs and a few erect and slender bristles on their uppersides.

The *palpi* are short but tolerably strong: the cubital joint is short, bent downwards, and slightly clavate at its fore extremity; the radial joint is short but is produced (on its whole width) at the upper extremity into a large and widening apophysis, which curves round in an inward direction and has its fore half bifid, the two limbs pointing outward; the inner limb is the slenderest, dark-coloured, blunt-pointed, curved, and somewhat cylindrical in form; the outer limb is stronger than the other, and goes off at its extremity into a fine and slightly curved point; this apophysis covers the greater part of the digital joint, which is small but of ordinary oval form: the palpal organs are prominent but not very complex; from their extremity, rather on the outer side, issues a long, dark brown, filiform, sharp-pointed spine, which bends round sharply upwards and backwards, continuing in that direction in a large but somewhat irregular coil, the point being directed inwards, near the extremity of the palpal organs and not far from the origin of the spine; another short, black, filiform spine runs close over the base of the palpal organs in a transverse direction, but it was difficult to see either its point of origin or its termination.

The *falces* are moderate in length and strength, rather directed backwards and armed with teeth towards their extremities on the inner side.

The *maxillæ*, *labium*, and *sternum* are normal in form, the last being slightly suffused with dusky brown.

The *abdomen* is short, oval, very convex above, and projects strongly over the base of the cephalothorax; it is jet-black in colour, glossy, and clothed very sparingly with short hairs.

An adult male of this very distinct species was received from M. Simon, by whom it was found in Corsica.

ERIGONE TRUNCATIFRONS, sp. n. (Plate XXVII. fig. 4.)

Adult male, length  $\frac{3}{4}$  line.

The whole of the fore part of this Spider is of a bright yellow colour, the upper part of the cephalothorax, as well as the femora and tibiæ of the legs, being tinged with orange. The caput is broad, a little

produced, of a somewhat truncate form at its upper extremity, not very dissimilar to that of *Erigone humilis* (Bl.); looked at in profile the occiput is a little roundly convex, with a hollow between its highest part and the thoracic junction. From the summit of the occipital convexity the caput slopes gradually to the fore central eyes, spreading out laterally on both sides into a strong tuberculiform elevation; at the summit of these elevations are the lateral pairs of eyes, from behind each of which a narrow indentation runs backwards. The whole of this fore slope of the caput (including the four pairs of eyes) is clothed pretty thickly with longish and, for the greater part, bent hairs, mostly diverging from the central longitudinal line and directed backwards; these hairs are very characteristic and give the Spider a very peculiar appearance.

The *eyes* are small, seated in four rather widely separated pairs on black spots, and form a rather narrow transverse area, whose width is no more than half its length; the lateral pairs, seated (as before mentioned) on two strong tuberculiform elevations, are nearly in a straight line with those of the hind central pair; those of this latter pair are rather smaller than those of the fore central pair, and are separated by an eye's diameter; these two pairs form an oblong rectangular figure, whose length is about double its breadth; and the interval between each eye of the hind central pair and the hind lateral eye nearest to it is equal to that between each of the former and the opposite fore central eye.

The *legs* are slender and moderately long, their relative length being apparently 4, 1, 2, 3; they are furnished with hairs and a slender spine-like bristle on the upperside of each of the femoral and tibial joints.

The *palpi* are short and furnished sparingly with hairs; the cubital joint is bent and rather longer, but less strong than the radial; this latter has its fore extremity produced into a long double twisted apophysis, its extreme point being rather obtuse and directed outwards; about halfway along the outer side of this apophysis is a rather small but prominent, pointed, dark-coloured spine, not far in front of which is another small pale prominence. This part of the radial joint is not easy to be made out clearly; the digital joint is of tolerable size; the palpal organs are highly developed and rather prominent, with one or two filiform black spines connected with them.

The *fulces* are small and directed backwards.

The *maxillæ*, *labium*, and *sternum* are of normal form.

The *abdomen* is of ordinary form and projects well over the base of the cephalothorax; it is of a dull blackish colour, suffused with yellowish on the fore part of the upperside, and its hinder portion marked with a series of 5 or 6 transverse curved yellowish lines, formed by tolerably distinct folds in the epidermis; the spinners are short, small, and of a pale yellow colour, and the spiracular plates are inclosed in a large, somewhat quadrangular, yellow area.

An adult male of this very distinct species was received from M. Eugène Simon, by whom it was found in Corsica.

ERIGONE HABILIS, sp. n. (Plate XXVII. fig. 5.)

Adult female, length  $1\frac{1}{3}$  line.

The *cephalothorax* of this fine species is of a deep rich chestnut-brown colour and very glossy; the caput is roundly convex above and slightly elevated; the thoracic junction is also rather elevated, so that between this point and the caput there is (when looked at in profile) a deepish hollow; the thoracic indentations are rather strongly marked, and the clypeus (the height of which is about half that of the facial space) projects a little forwards towards its lower margin.

The *eyes* are in four pairs, of tolerable size, and form a somewhat roundish oval figure; those of the hind central pair are separated by an interval equal to an eye's diameter, and each is separated by an equal space from the hind lateral eye on its side; those of each lateral pair are slightly obliquely placed, and are contiguous to each other; those of the fore central pair are the smallest of the eight, and situated rather beyond the straight line formed by the fore laterals. They are not quite contiguous to each other, but are separated by a small interval equal to that which divides each of them from the fore lateral eye nearest to it.

The *legs* are long and strong, particularly the femora and tibiæ of the first two pairs; and their relative length appeared to be 4, 1, 2, 3; their colour is yellow, except the femora, which are a bright rich orange-red, and the tibiæ of the first and second pairs, which are strongly suffused with brown; they are all well clothed with hairs, especially the tibiæ of the two pairs just mentioned.

The *palpi* are short, of a dark greenish yellow-brown colour, and furnished with hairs and longish bristles.

The *falces* are tolerably long and strong, slightly inclined backwards, a little prominent near their base in front, and similar in colour to the palpi; they are armed with sharp teeth towards the extremities on their inner sides.

The *maxillæ* and *labium* are of normal form; and their colour is similar to that of the falces, that of the sternum being like that of the cephalothorax.

The *abdomen* is oval, and projects well over the base of the cephalothorax; it is of a dull black colour, sparingly clothed with short hairs: the genital aperture is of simple but characteristic form.

A single example of this Spider was received in 1873 from M. Eugène Simon, by whom it was found at the Col de Natoia between Embrun and Barcelonnette.

Although it is possible that this may be the female of some male already described, I am inclined to think it is of a new species. It is allied to *E. unicornis*, Cambr., and to *E. clara* (id.); but the form of the cephalothorax is different and very characteristic, as also is the length, size, and colour of the legs, the brown tibial joints of those of the first and second pairs, with their more conspicuous clothing of hairs, making them very conspicuous.

It is impossible to conjecture what structure the male may possess; but it will be probably found to resemble the female in general colouring as well as in that of the tibiæ above mentioned.



## ERIGONE DORSUOSA, sp. n. (Plate XXVII. fig. 6.)

Adult male, length  $\frac{3}{4}$  line.

The *cephalothorax* of this Spider is of a pale dull yellowish colour slightly tinged with green; it is short, rather flattish, and of a somewhat uniform convexity, the occiput, however, being rather gibbose, but not suddenly elevated; the summit of the gibbosity is furnished with a few very short hairs, and the profile line from the summit forms a slight but continuous curve; on each side of the summit is a large, longitudinal, strongly marked indentation or excavation; and the normal thoracic indentations appeared to be marked by converging lines of very small punctures.

The *eyes* are in two transverse lines or four pairs, as nearly as possible halfway between the lower fore margin of the caput and its summit; they are of ordinary size, those of the hind central pair are separated from each other by the distance of an eye's diameter, and are nearer together than each is to the hind lateral on its side; those of the fore central pair are smallest of the eight, contiguous to each other, and each is separated from the hind central eye nearest to it by the diameter of the latter; those of each lateral pair are obliquely placed and contiguous to each other, each being separated from the fore central eye on its side by an interval rather greater than that which divides the latter from the hind central eye nearest to it.

The *legs* are short, slender, of a pale dull yellowish colour, furnished pretty thickly with hairs, and a few fine erect bristles on the upper sides; their relative length appeared to be 4, 1, 2, 3.

The *palpi* are short, of moderate strength, and similar to the legs in colour; the cubital joint is larger at its fore than at its hinder extremity; the radial is shorter and has its fore extremity expanded, with a prominent but short curved point about the middle and a short truncated projection on its outer side, on the margin near which is a row of strong bristly hairs; the digital joint is not very large, of an oval form, with a boldish prominence at the middle of its outer margin; the palpal organs are well developed and moderately complex, at their outer extremity is a black tapering spine coiled in a circular form, and its prominent point is very close to that of another fine black spine which springs from within the coil of the other.

The *falces* are of moderate length and strength, and project a little forwards; they are armed with a row of very minute teeth on their inner margin forwards, and, like the *maxillæ* and *labium*, are similar in colour to the cephalothorax.

The *sternum* is of a dull blackish colour mixed with pale yellowish, very convex and glossy, and marked thinly with minute punctures.

The *abdomen* is oval, but of a somewhat cylindrical form, and does not project over the base of the cephalothorax; it is of a dull blackish colour, and (in spirit of wine) thickly mottled with pale yellowish points and some transverse angular lines in a longitudinal series on the hinder half of the upperside; the colour of the spinners is similar to that of the legs.

An example of this minute Spider was sent to me in 1874 by M.

Eugène Simon, by whom it was found on the Glacier du Casset, in the French Alps. It is allied to *E. pallens* (Cambr.); but may be easily distinguished by the much stronger and broader indentations near the summit of the caput, and the far greater distance between the fore extremity of the indentations and the eyes of the lateral pairs.

ERIGONE ANTENNATA, sp. n. (Plate XXVII. fig. 7.)

Adult male, length  $\frac{3}{4}$  line.

The *cephalothorax* of this Spider is of a yellowish-brown colour, the legs, palpi, and falces rather paler, and the underparts suffused with black; the fore part of the caput is elevated, but not very strongly; the hinder part of the elevation slopes in a rounding form; and the point of junction of the thoracic segments is a little higher than the occipital depression; the clypeus rather exceeds in height two thirds of that of the facial space; and from near the centre of the ocular area (just above the fore central pair of eyes) springs a single strong, prominent, curved, setiform spine, whose point is directed rather abruptly downwards.

The *eyes* are in the usual four pairs, or two transverse curved lines, on the fore part of the elevation of the caput; the interval between each of the hind central eyes and the fore lateral on its side is equal to that between each and the fore central nearest to it, and, with these two, forms as nearly as possible an equilateral triangle; the interval between those of the hind central pair rather exceeds an eye's diameter, and is much less than that which separates each of them from the hind lateral on its side; the eyes of each of the lateral and fore central pairs respectively are contiguous to each other, those of the former being very obliquely placed.

The *legs* are rather long and slender; their relative length appeared to be 4, 1, 2, 3; and they are furnished with (apparently) short fine hairs only.

The *palpi* are rather strong and of moderate length: the cubital joint is much longer and stronger than the radial; it is bent, and its fore extremity is considerably stronger than its hinder one: the radial joint is small and very short, its fore extremity above and rather on the inner side is produced into an apophysis whose pointed extremity curves sharply round, pointing inwards and rather downwards; from the fore part, on the upperside of the radial joint, issues a curved setiform spine of about the same length, nearly as strong as that between the eyes; its point, however, is directed upwards: the digital joint is rather large, and, having a strong prominence both at its base and outer side, is of an irregular or somewhat roughly triangular form: the palpal organs are highly developed and very complex; among other strong prominent corneous processes there is, near their outer extremity, a long, exceedingly slender, black, filiform, prominent, circularly curved spine.

The *falces* are of moderate length and strength, rather directed backwards, and armed with a few sharp teeth on their inner sides towards the extremities.

The *abdomen* is of moderate size, not very convex above, but projects over the base of the cephalothorax; it is clothed very sparingly with short hairs, and is of a jet-black colour.

The curved spine on the forehead and those on the radial joints of the palpi are very characteristic, and will readily distinguish this Spider from all other known species of this group of the genus *Erigone*.

A single example was received from M. Eugène Simon, by whom it was found with others on the Col des Ayes, Casset, in the French alpine regions.

*ERIGONE VAPORARIORUM*, sp. n. (Plate XXVII. fig. 8.)

Adult male, length 1 line.

The colour of the cephalothorax, falcæ, maxillæ, labium, and sternum is a deep rich brown, the latter nearly black; that of the legs is reddish orange-yellow; the palpi are yellow tinged with brown; the radial and digital joints dark brown, and the abdomen black.

The *cephalothorax* is prominent in front, but not elevated, the fore part of the caput being broad, obtuse, and projecting forwards; there is a rather strong, but shallow, transverse impression immediately behind the ocular area, while the occiput is full and rounded; the surface is glossy, and the ocular area is furnished pretty thickly with hairs directed backwards; the clypeus retreats strongly, and its height equals half that of the facial space.

The *eyes* are in four pairs, and present a rather unusual figure, forming a rectangle on the flattish surface of the fore part of the caput; this figure is caused by the unusually wide separation of the eyes of the hinder pair, these, which are slightly the largest of the eight, being divided by an interval almost equal to that between the fore lateral eyes; those of the foremost pair are very small, dark-coloured, and inconspicuous, and near, but not contiguous to each other; those of each lateral pair are contiguous, and have the slightest possible oblique direction, each being almost in a line with the eye of the hinder pair on its side.

The *legs* are moderate in length and strength; their relative length is 4, 1, 2, 3; they are furnished with hairs and a very few slender prominent bristles.

The *palpi* are moderately long and strong: the cubital joint is rather clavate and bent downwards: the radial joint is short, but has its fore extremity on the upperside produced into a large apophysis, covering the greater part of the digital joint, and directed inwards; the extremity of this apophysis is bifid, the upper, or outer corner being produced into a strong, roundly clavate, prominent projection, curving outwards and upwards, while the inner, or lower, corner is produced into a curved, tapering, sharp-pointed one; this clavate projection makes the length of the radial apophysis almost equal to that of the digital joint; this joint is rather large, and of an oval form: the palpal organs are highly developed, prominent, and complex; among the corneous processes of which they

are composed is one at their base on the outer side, rather prominent and obtuse at its end; from near their extremity, on the same side, a strongish pale spine curves downwards and backwards, ending in a slender, curved, filiform point; and in front of this is another, shorter and stronger, and tapering to a point, but without a filiform ending.

The *falces* are moderately long and strong, and are straight, but inclined backwards towards the labium.

The *abdomen* is oval, moderately convex above, and projects a little over the base of the cephalothorax; it is glossy, black, and sparingly clothed with short hairs.

A single adult male of this very distinct *Erigone* was received from M. Simon, by whom it was found in France (Col de Natoia, between Embrun and Barcelonnette). It is allied to *Erigone* (*Walckenaëra*) *humilis* (Blackw.), *E. affinitata*, Cambr., and *E. crassiceps* (Westr.) = *E. bucua* (L. Koch). The last two species may be distinguished from *E. vaporariorum* by their more elevated caput; while *E. humilis* has a broader and more obtuse termination to the caput, and is without the transverse depression between the ocular area and the occiput, and the backward-directed hairs from this area, both of which are strongly characteristic of the present species.

ERIGONE CORNICULANS, sp. n. (Plate XXVII. fig. 9.)

Adult male, length  $1\frac{1}{3}$  line, rather more than  $2\frac{1}{2}$  millimetres.

The *cephalothorax* of this species, which is very nearly allied to *E. monoceros* (Wid.), is yellow, the caput, as well as the normal indentations, being slightly suffused with dusky brown; the fore part of the caput is slightly but gradually elevated, and a little prominent; and from the centre of the ocular area there rises a distinct horn-like eminence; this eminence is slightly curved, projects forwards, and is of a tapering form, blunt at the extremity, or of a somewhat subconical shape; its fore side and summit are furnished with some short, curved, clavate, prominent hairs, and some ordinary ones issue from its hinder part.

The *eyes* are of tolerable size, and seated in four pairs round the eminence on the fore part of the caput, those of each pair respectively being contiguous to each other. The four pairs describe very nearly a circle; but the interval between each lateral pair and the hinder pair is greater than that between the lateral and front pairs; the former interval is equal to the diameter of one of the hinder pair of eyes, the latter interval to the diameter of one of the front pair.

The *legs* are long and slender, their relative length being 4, 1, 2, 3; there appeared to be, however, but little difference between those of the first and second pairs; they are similar in colour to the cephalothorax, and are furnished with inconspicuous hairs and fine bristles.

The *palpi* are slender and of moderate length; their colour is pale yellow; the digital joint, however, is suffused with brown, and the radial joint is margined with black-brown on its inside: the cubital joint is clavate, or enlarges gradually from its hinder to its fore extremity: the radial joint is shorter, but stronger, than the cubital, and



spreading, and its upperside is produced into a strong, tapering, curved apophysis, the extremity of which is directed outwards over the base of the digital joint; the extremity of this apophysis is emarginate or circularly notched on its outer side, and at its base is a short, blackish, tapering, sharp-pointed, spine-like projection: the digital joint is large and of ordinary form: the palpal organs are well developed and rather complex, with a strongish, circularly curved, tapering, sharp-pointed spine at their fore extremity, on the outer side; and from near the base of this spine, and within its curvature, there issues another, short, nearly straight, and directed rather backwards.

The *falces* are moderately long and strong, prominent above the middle of their fore sides, divergent towards their extremities, where, on their inner edges, they are armed with a few small sharp teeth; they are of a yellow colour slightly suffused with brown, and have a few prominent bristly hairs on their fore sides. On the lower part of the outer side of each falx, and rather towards the hinder part, are a few transverse, slightly oblique, parallel, scratch-like marks.

The *maxillæ* and *labium* are of normal form, and of a dull yellowish colour.

The *sternum* is yellow, convex, glossy, and heart-shaped, and furnished with a few fine, prominent, dark, bristly hairs.

The *abdomen* is oval, moderately convex above, of a dull, somewhat greenish-brown hue, and sparingly clothed with fine hairs.

Although, for the most part, the above description might apply also to *Erigone monoceros* (Wid.), yet there will be no difficulty in distinguishing the two species by the greater size and height of the eminence on the ocular area of the present species, also by the larger size of the eyes and the contiguity of those of the hinder pair, the greater size (particularly in the width) of the ocular area in *E. monoceros*, and consequently the larger intervals between the different pairs of eyes. The radial apophysis also differs in the circular emargination at its extremity being quite on the outer side, and not (as in *E. monoceros*) very nearly at its extremity; and the spine-like projection on its outer side is shorter and less conspicuous. The circularly curved spine also, at the outer extremity of the palpal organs, in this latter species is shorter and proportionally stronger; and the extreme fore part of the caput is also broader and flatter, the spider itself, too, is smaller, and, in examples that have been some time adult, more richly and darkly coloured.

This species is also allied to *Erigone directa* (Cambr.) and *E. indirecta* (ej.) (North-American species); but it may be directly distinguished by the absence in these latter of clavate hairs on the horn-like eminence of the caput, the hairs in these species being of an ordinary nature.

The female, though a little larger, and devoid of the horn-like eminence on the caput, resembles the male in colours and general characters; the eyes however are more closely grouped, and there is a distinct interval between those of the hinder pair; the fore part also of the caput is less prominent. The form of the genital

aperture is characteristic, though somewhat resembling that of several others of this group, nearly allied to each other.

A single adult example of each sex was received in 1872 from M. Eugène Simon, by whom they were (with others of the same species) captured at Sappey, in France; an adult male of the same species, but darker and more richly coloured, had been previously received from M. Simon, from the neighbourhood of Paris, but was at the time mistaken for *E. monoceros*.

ERIGONE NIGROLIMBATA, sp. n. (Plate XXVIII. fig. 10.)

Adult male, length rather less than 1 line.

The whole of this exceedingly remarkable Spider is of a pale yellow colour, the cephalothorax and legs being rather the clearest and brightest, the former margined laterally with black. The caput is greatly elevated, the upper portion being roundish oviform and directed backwards; the part occupied by the fore central pair of eyes is prominent; and the height of the clypeus exceeds half that of the facial space; a strong longitudinal indentation or excavation on each side divides the upper part of the caput from the lower; the upper part is furnished with a few fine pale hairs.

The *eyes* are very unusually placed; those of the hind central pair, instead of being placed on or near the summit of the elevated oviform portion, are placed at its lower part, one on each side immediately above and behind the hind lateral eye, and almost contiguous with it; the eyes of each lateral pair, together with the hind central one on its side, form a short curved line on each side of the caput; those of the fore central pair are the highest up of all, instead of being, as in most other species, the lowest.

The *legs* are slender, moderate in length, their relative length (apparently) 4, 1, 2, 3; they are furnished with hairs and a few prominent black slender spines and bristles, those on the two hinder pairs being the most conspicuous; whereas in the adult female those on the two foremost pairs are strongest, particularly a row on the inner side of each of the tibial joints, which are long, strong, and very similar to those on the corresponding legs of *E. sundevallii* (Westr.).

The *palpi* are moderate in length and strength; the cubital joint is longer than the radial; the latter is prominently pointed beneath at its fore extremity, and has an almost perpendicularly erect apophysis springing from near the fore part of its upperside; this apophysis appeared to be nearly or about half the length of the joint, and is truncate at its extremity, which is rather broader than the middle portion: the digital joint is oval, produced at its hinder extremity into a long, strong, curved, corneous apophysis, terminating in a tapering, twisted, or sinuous, sharp, filiform spine, whose point is directed outwards: the palpal organs are highly developed and complex; among other corneous processes a somewhat sinuously curved, black, filiform spine is connected with them at their fore part on the underside.

The *falces* are small, nearly perpendicular, and armed with a few minute teeth near their inner extremities.

The *maxillæ*, *labium*, and *sternum* are of a normal character.

The *abdomen* is of a short oviform shape, very convex above, but not projecting at all over the base of the cephalothorax; it is thinly clothed with hairs, and of a pale, dull, straw-yellow colour, with a strong, rather irregularly defined, longitudinal, dark, sooty-brown band on each side of the upper part, but these do not meet either before or behind; a somewhat similar band runs along each side of the underpart of the abdomen; and the spinners have an indistinct circle of the same colour as the bands.

The adult female resembles the male in colours and general characters, but differs in the legs being armed (as mentioned above) with much stronger and more numerous spines, and in wanting the elevation on the caput; the genital aperture is of characteristic form (fig. 10, *e*).

This Spider combines several very remarkable characters, by which the male particularly may be distinguished from all other known species of this group possessing an elevated caput—that is, the peculiar position of the hind central eyes, the long, curved, horn-like projection at the hinder part of the digital joint of the palpi, and the dark longitudinal bands on the abdomen.

An adult example of each sex was sent to me by M. Eugène Simon, by whom they were, with others, found in old faggots of pine wood at Gyé sur Seine (Département de l'Aube).

ERIGONE LEPRIEURI, sp. n. (Plate XXVIII. fig. 11.)

Adult male, length rather over 1 line.

The *cephalothorax* of this Spider is of a brightish yellow-brown colour, indistinctly but rather broadly margined on the sides with dusky brown: the caput is elevated; and its upper part overhangs the occiput, and slopes a little forwards in front; the height of the clypeus (which is nearly perpendicular) is about two thirds of that of the facial space.

The *eyes* are in the usual general position; but the wide separation of those of the hind central pair causes them to form three groups—a lateral one, on each side, of three, and a central one of two eyes; those of the ordinary hind central pair are seated, one near the middle of each side of the summit of the elevation of the caput, and the interval which separates them is very nearly equal to that between the two fore lateral eyes; each of them is also rather less than an eye's diameter distant from the hind lateral on its side.

The *legs* are moderate in length and strength, their relative length being 4, 1, 2, 3; they are of a bright orange-yellow colour, and furnished with hairs and a very few prominent bristles on their uppersides.

The *palpi* are strong, of tolerable length, and rather paler and duller-coloured than the legs: the cubital joint is rather long (half the length of the femoral joint), bent, and enlarged gradually to its fore extremity: the radial joint is short, spreading, and its fore extremity on the upperside is produced into a tolerably long, not very strong, but rather curved apophysis, having near its ex-

tremity on the underside a small, sharp, black, tooth-like spine, directed rather backwards; from the outer side of this joint there arise several strong bristles, besides others less strong: the digital joint is not very large, it is of a short oval form, and has a strongish prominence past the middle of the outer side: the palpal organs are prominent but not very complex; at their extremity on the outer side is a very strong, tapering, sharp-pointed, strongly curved spine or, rather, spiny process.

The *falces* are small, vertical, armed with a few very minute teeth on their inner sides near the extremity, and similar to the cephalothorax in colour.

The *maxillæ* and *labium* are of normal form, and similar in colour to the falces.

The *sternum* is of a deep brown colour.

The *abdomen* is oval, tolerably convex above, jet black in colour, glossy, and sparingly clothed with hairs.

An adult male of this very distinct species was received in 1874 from M. E. Simon, by whom it was found in Algeria.

ERIGONE STYLIFRONS, sp. n. (Plate XXVIII. fig. 12.)

Adult male, length not quite 1 line.

The whole of the fore part of this Spider is bright yellow, the cephalothorax being strongly tinged with reddish orange, and the femora and tibiæ of the legs with orange: the caput is more or less suffused with black-brown; towards its fore part is a not very large oval eminence, the hinder portion of which is obtusely pointed and directed backwards on each side; dividing it from the lower segment of the caput is a strong longitudinal indentation, extending from each hind lateral eye to the hinder part of the eminence; in front of this eminence is another small one, from which two sharply curved or bent, styliform, prominent and divergent projections issue, these projections are of a pale yellowish colour, diaphanous, and their sharp-pointed extremities are directed backwards and outwards; between them and the fore central pair of eyes are some short prominent black bristly hairs.

The *eyes* are small, not greatly differing in size, and are placed in the usual four pairs on black spots; those of the hinder pair are separated from each other by a diameter's distance, in a transverse line near the upper fore margin of the eminence on the caput; those of each lateral pair are contiguous to each other, and placed on a slight tubercular eminence; those of the fore central pair are smallest of the eight, dark-coloured, almost contiguous, and placed a little in advance of the straight line formed by the two fore lateral eyes. The extreme length and breadth of the ocular area are about equal; if any thing, the breadth is rather the greatest.

The *legs* are tolerably long and slender, except the femora of the first and second pairs, which are stronger than usual, principally towards their base on the upperside; their relative length is 1, 4, 2, 3; and they are furnished with hairs only.

The *palpi* are slender and moderately long, the cubital joint is



longer than the radial, slightly clavate, and bent downwards; the radial is very short, produced behind into a strong obtuse apophysis, and in front into a long, tapering, rather curved, pointed one, which fits rather closely upon the external surface of the digital joint and is directed outwards; the digital joint is of moderate size; and the palpal organs are neither very prominent nor complex; at their extremity is a very slender filiform, sharp-pointed, circularly curved, closely-fitting spine.

The *falces* are of moderate length; but not very strong; they are very nearly vertical, and armed on their inner edges towards the extremity with minute denticulations.

The *maxillæ* and *labium* are of normal form.

The *sternum* is of the ordinary heart-shape, and very convex and glossy.

The *abdomen* is oval, moderately convex above, of a jet-black colour, thinly clothed with hairs, and projects, but not very strongly, over the base of the cephalothorax.

An adult male of this Spider, which is nearly allied to *Erigone antica* (Wid.) and *E. flavida* (Menge), was received from M. Simon, by whom it was found in Corsica.

ERIGONE EBORODUNENSIS, sp. n. (Plate XXVIII. fig. 13.)

Adult male, length barely 1 line.

The cephalothorax, falces, maxillæ, and labium of this Spider are yellow-brown, the legs and palpi dull yellow, the digital joints of the latter strongly tinged with brown, the sternum and abdomen dull brownish black.

The fore part of the *cephalothorax* is bluff and obtuse, the caput being slightly elevated, the summit rounded, the occipital slope tolerably abrupt; the ocular area slopes forwards, and its profile, with that of the clypeus (whose height equals not quite half that of the facial space), forms an almost evenly curved line; from a little above and behind each hind lateral eye a deep tapering indentation runs backward in a horizontally longitudinal line to the lower part of the occiput; the other, normal, indentations are fairly but not very strongly marked; the ocular area has a few short hairs in a longitudinal central line; some of these are directed downwards, and some upwards.

The *eyes* are in the usual four pairs and seated on black spots; those of one pair, situated on the fore part of the summit of the caput, just at the beginning of its front slope, are separated by nearly two diameters; the two lateral pairs are placed at a considerable distance below; those of each of these pairs, respectively, are contiguous to each other and placed slightly obliquely, and with the eyes of the upper pair they form a quadrangular figure, three sides of which are about equal in length, while the fourth (*i. e.* the upper) side is considerably less; the eyes of the fore central pair are the smallest of the eight, dark-coloured and obscure, contiguous to each other, and placed in a straight line with the two fore lateral eyes; except the fore central pair, the eyes are shining pearly white.

The *legs* are slender, moderately long, furnished with hairs, and a very few slender prominent bristles on their uppersides.

The *palpi* have the humeral joint moderately long and slender: the cubital joint is clavate, slightly bent downwards, and about half the length of the humeral joint: the radial joint is short, spreading, prominent behind, and produced at its fore extremity on the upper-side into a very large apophysis, covering the greater portion of the digital joint; this apophysis is considerably the broadest at its fore extremity, where it is strongly emarginate or bifid, the outer limb of the bifid part being the longest, prominent, and obtuse, and broadest at its extremity; the inner one has a curved point directed rather downwards, and just within this curved point is a small, slightly-curved, sharp-pointed spine: the digital joint is of moderate size and of a somewhat oblong form: the palpal organs are well developed and complex; from their fore extremity a strong, black, tapering, sharp-pointed spine curves round outwards and backwards in a somewhat sinuously circular form.

The *falces* are neither very long nor strong; they are obliquely cut away on their inner sides towards the extremities, armed with minute teeth, and directed strongly backwards towards the maxillæ.

The *maxillæ*, *labium*, and *sternum* are normal in form and structure.

The *abdomen* is large, of an oval form, tolerably convex above, and projects over the base of the cephalothorax; it is of a dull brownish black colour, and sparingly clothed with short hairs.

A single example of the adult male of this species was sent me by M. Eugène Simon from the Col de Natoia in France; it is very similar to some others in the form of the cephalothorax; but the structure of the palpi will serve to distinguish it at once.

ERIGONE COCCINEA, sp. n. (Plate XXVIII. fig. 14.)

Adult male, length nearly  $1\frac{1}{4}$  line.

The cephalothorax, falces, maxillæ, labium, and sternum, as well as the upper part of the abdomen, of this Spider are of a bright orange-red colour, that of the legs and palpi being bright orange-yellow.

The *cephalothorax* has the hinder, or thoracic, portion marked with strong circular punctures, disposed in converging lines, following mainly the course of the normal indentations: the caput has an oval, tolerably strong eminence near the occiput; the fore extremity of the caput is also prominent, thus dividing the caput into two tolerably distinct lobes, of which the foremost or lower one is the strongest; the upper lobe is divided laterally from the lower one by a large excavation running backwards from its broadest and deepest part, above and behind each lateral pair of eyes, to the hinder part of the upper lobe (or eminence); the front slope of this eminence is steep though rounded; but the hinder one is much more gradual: the height of the clypeus is about half that of the facial space, its upper part is rounded and prominent, the lower part impressed and retreating; on the fore slope of the cephalic eminence are a few bristly black hairs directed forwards and downwards, meeting a few

others directed contrarily from the upper part of the lower segment of the caput.

The *eyes* are of tolerable size, and do not differ greatly in this respect; they are placed in the usual four pairs on small black spots; those of one pair, on the upperside of the fore part of the cephalic eminence, are separated from each other by an interval of about two diameters' extent; another pair is seated on each side of the upper part of the lower segment; the eyes of each of these lateral pairs are contiguous to each other, the eyes of the fourth, or fore central, pair are not quite contiguous to each other, being separated by nearly half a diameter; they are of an oval shape and rather obliquely opposed to each other, and, though rather darker than the rest (which are pearly white), are lighter-coloured and larger than usual, being equal in size to those on the cephalic eminence; the width of the ocular area at its widest or lower part a little exceeds, transversely, the length of its longitudinal diameter; the eyes of the fore central pair are placed a little above the line of the fore laterals, and each of these is separated from the fore central nearest to it by the diameter of one of the former.

The *legs* are moderate in length and strength; their relative length appeared to be 4, 1, 2, 3; they are furnished, but not very conspicuously, with short hairs.

The *palpi* are short; the cubital joint is slightly clavate at its fore extremity, and a little bent downwards; the radial joint is shorter than the cubital, and rather spreading above at its fore part, whence it is produced into a not very long, but rapidly tapering, pointed apophysis, the point being very slightly curved and rather pointed outwards; the digital joint is of tolerable size and ordinary form: the palpal organs are prominent, well developed, but not very complex; near their centre is a strong, transverse-oval, pale yellowish, corneous, convex lobe; and immediately in front of or below this is a strong, somewhat sinuously and circularly curved, sharp-pointed, black-brown spine.

The *falces* are neither very long nor strong; they are directed a little backwards, and have a few minute teeth on their inner edge towards the extremities.

The *maxillæ* and *labium* are of normal form; and the *sternum* is slightly marked with punctures.

The *abdomen* is rather large, and of a broad-oval form, tolerably convex above; the upper part is covered with a very distinct, coriaceous, thickly and strongly punctured epidermis of a rich orange-red colour, the sides and lower part being of a pale straw-yellow colour, spotted with minute orange-brown points or punctures; it is thinly clothed with short hairs; the spiracular plates and space between them, as well as a small oval portion in front of the spinners, are also of an orange-brown colour.

An adult male of this brightly coloured Spider, which is allied to *E. bucephala* (p. 217), was received from M. Simon, by whom it was found in Morocco. In the form of the cephalothorax it bears some resemblance to many other species; but its colour, combined with the



punctured surface of the abdomen, thorax, and sternum, and the structure of the palpi and palpal organs, will serve to distinguish it readily from other European species possessing a somewhat similarly formed caput.

ERIGONE FORAMINIFERA, sp. n. (Plate XXVIII. fig. 15.)

Adult male, length 1 line.

The *cephalothorax* is glossy and of a deep blackish-brown colour; the normal indentations are tolerably strong, and the surface near the margins is somewhat rugulose: the caput has the fore part, which is rather lighter-coloured, elevated and prominent; it is divided into two nearly equal lobes by a deep transverse cleft; the upper fore margin of the hinder lobe and the hinder margin of the front lobe approach each other pretty closely, but do not meet; the front lobe is rather the strongest, but of less height than the hinder one, the deepest point of the cleft is on a level with the profile line of the hinder part of the caput; the summit of each lobe is furnished pretty thickly with hairs, some of which meet over the cleft.

The *eyes* are in the usual four pairs; one pair is seated near the summit of the hinder lobe of the caput, an eye being on either side of it, another pair on the fore part near the summit of the front lobe, separated from each other by rather more than an eye's diameter, and a pair on either side a little below the base of the cleft: the eyes of each of these last two pairs are contiguous to each other; those of the front lobe are dark-coloured, indistinct, and the smallest of the eight; the rest are conspicuous, of a shining pearl-white, and do not differ much in size; the height of the clypeus considerably exceeds half that of the facial space.

The *legs* are slender, of moderate length, their relative length being 4, 1, 2, 3; they are of a dark orange-yellow colour, slightly tinged with brown, furnished with hairs, and a single, spine-like, prominent bristle on the upperside of each of the genual and tibial joints of the third and fourth pairs; there are several other bristles on the corresponding joints of the first and second pairs, but these are slenderer and less conspicuous.

The *palpi* are moderate in length and strength, of a yellow-brown colour, the radial and digital joints dark brown and furnished with hairs: the cubital joint is rather clavate, bent downwards, and much longer than the radial, which last, however, has the appearance of greater length from being produced at its fore extremity, on the upperside, into a long and broad apophysis, covering a large portion of the digital joint; this apophysis is of a somewhat oblong form, with a sharp-pointed tapering spine at its fore extremity on the inner side, bent sharply round and running across near its fore margin, which it rather exceeds in length, and a strong, rather bent, pointed prominence at its base on the outer side; it is also rather produced behind: the cubital joint has a single, prominent, spine-like bristle at its fore margin on the upperside; the digital joint is large and of ordinary form; the palpal organs are prominent and complex, with corneous processes and spines, and a prominent, tapering, pointed, slightly



curved, pale-coloured spine projects, with rather an outward direction, from their fore extremity.

The *falces* are moderately long and strong, and rather obliquely cut away towards their inner extremities, where they are armed with small sharp teeth; they are similar in colour to the fore part of the caput.

The *maxillæ* and *labium* are of the usual form, and of a deep brown colour.

The *sternum* is of ordinary shape, of a deep brown-black colour, glossy, furnished with a few fine bristly hairs, and, under a lens, apparently marked with a few fine punctures.

The *abdomen* is oval, tolerably convex above, and projects over the base of the cephalothorax; its colour is a glossy black, clothed sparingly with hairs.

This Spider, of which two examples were sent to me by M. Eugène Simon, from France (Col de Natoia), is allied to *E. alpina* (Cambr.) and *E. cucullata*, Koch; but it may easily be distinguished by the larger proportional size of the front lobe of the caput, which in those two species is smaller than the hinder lobe; it is also allied to *E. cristata* (Bl.); but the very different form of the caput and its cleft, as well as its larger size and shorter form, will distinguish it at once both from that and its near ally *E. permixta* (Cambr.). In the form of the caput and the cleft which divides it into two lobes, *E. foraminifera* bears a strong resemblance to *E. fissiceps* (Cambr.), a North-American Spider; but the smaller size of the latter, its different colours, and the coriaceous punctured epidermis of the upperside of the abdomen, as well as the strikingly different form of the palpi, will distinguish it at a glance.

ERIGONE LUCASI, sp. n. (Plate XXVIII. fig. 16.)

Adult male, length  $\frac{2}{3}$  of a line.

The *cephalothorax* is of a dark blackish-brown colour, the thoracic indentations indicated by black lines; the greater part of the caput is strongly elevated, the elevation projecting rather forwards, and separated from the fore part of the caput proper by a strong transverse indentation; the occipital region of the elevation forms a sloping curved profile-line; a large deep longitudinal indentation or excavation divides the elevation from the caput on either side; the fore part of the elevation is clothed with a few short hairs, mostly directed downwards, and meeting others directed upwards from the fore part of the caput; the height of the clypeus considerably exceeds half that of the facial space.

The *eyes* are in the usual four pairs; those of the upper (or hind lateral) pair are placed one on each side of the fore part of the summit of the elevation, and form a line only a very little, if any, shorter than that formed by the two fore lateral eyes; those of each lateral pair are placed on the sides of the fore part of the caput proper (or lower segment of the caput); and those of the fore central pair are on a strongish tubercular prominence, very indistinct, though not very minute, and not quite contiguous to each other.

The *legs* are rather short and not very strong; they are of a bright orange-yellow colour, furnished with hairs, and their relative length is 4, 1, 2, 3.

The *palpi* are of moderate length and strength, and of a dull yellow colour; the cubital joint is rather long, and nearly cylindrical in form; the radial is very short, and its fore extremity on the upperside is produced into a not very long, enrvd, tapering, and not very sharp-pointed apophysis directed strongly inwards; on the outer margin of the radial joint is a group of prominent bristly hairs; the digital joint is small; and the palpal organs are rather prominent, but not very complex or presenting any very marked feature.

The *falces* are small, nearly vertical, similar to the palpi in colour, and armed with a few very minute teeth on their inner sides towards the extremity.

The *maxillæ* and *labium* are normal in form, and rather darker in colour than the falces.

The *sternum* is tolerably convex, glossy, and of a deep black-brown colour.

The *abdomen* is of a short oval form, and considerably convex above; it projects a good deal over the base of the cephalothorax, and is of a glossy jet-black colour, clothed sparingly with short hairs.

An adult male of this Spider was forwarded to me in 1874 by M. Simon, by whom it was found at Algiers. By its specific name it is dedicated to Mons. H. Lucas (Curator of the Jardin des Plantes, Paris), whose voluminous work on the articulate animals of Algiers is too well-known to need more than a passing reference.

ERIGONE INEDITA, sp. n. (Plate XXVIII. fig. 17.)

Adult male, length nearly 1 line.

The *cephalothorax* is small, of a dull darkish yellow-brown colour, the converging indentations of the thorax indicated by rows of not very distinct pock-like marks or punctures; the fore part of the caput is rather prominent, and on the hinder part, at the occiput, is a strong, somewhat globular eminence, strongly constricted or excavated at the sides where it joins the caput; the hinder part of the eminence is well rounded; the fore part, looked at in profile, slopes rather downwards, and there is a deepish transverse indentation between it and the ordinary prominence of the caput, thus forming two distinct segments, of which the hinder one is the largest when seen in profile; the height of the clypeus is less than half that of the facial space; there are a few short prominent hairs on the cephalic eminence, and a few on the lower segment.

The *eyes* are in the usual four pairs; those of the upper pair are in a transverse line, nearly two diameters from each other, on the upper part of the cephalic eminence near the summit at the beginning of the front slope; those of each lateral pair are at the upper part on either side of the lower segment of the caput, close in front of the fore extremity of the lateral excavation, and they are contiguous to each other; those of the fore central pair are the smallest

of the eight, dark-coloured, indistinct, and seated contiguously (or nearly so) to each other at the extremity of the lower segment of the caput; the longitudinal diameter of the ocular area is greater than its transverse one.

The *legs* are moderately long, slender; and their relative length appeared to be 4, 1, 2, 3; they are furnished with inconspicuous hairs, and a very few slender erect bristles on their uppersides; the colour of the legs is yellow.

The *palpi* are rather long, slender, and their colour is similar to that of the legs; the cubital joint is long and slightly clavate: the radial joint is short, with its fore extremity, rather towards the outer side, produced into a fine, tapering, pointed, almost straight apophysis; the length of the joint with its apophysis is about half that of the cubital joint; the digital joint is rather small, and of ordinary form; the palpal organs are neither very prominent nor complex; in close contact with them, and at their extremity, is a small circularly curved sharp filiform spine.

The *falces*, *maxillæ*, and *labium* are rather lighter in colour than the cephalothorax, but present nothing unusual in form or structure.

The *sternum* is of ordinary form, and its colour is dark black-brown.

The *abdomen* is of a short oval form, very convex above, and of a pale, dull, straw-yellow colour, with a large dark-brown oval patch on the fore part of the upperside; and it is sparingly clothed with short inconspicuous hairs; the spinners are rather larger than usual, but perhaps they may have been accidentally protruded.

The adult *female* is rather larger than the male, but resembles it in colours and general characters; the caput, however, wants both the eminence and prominence of that sex, being merely of the ordinary form, with the occipital region slightly convex and rounded, and the clypeus prominent or, rather, projecting forwards. The genital aperture is somewhat horseshoe-shaped, and has within its opening some small processes, which, when looked at in profile, give it a rather prominent appearance.

An adult example of each sex was sent to me in July 1871, by M. Simon, by whom they were found in the neighbourhood of Paris; it is allied to *E. trifrons* (Cambr.); but the pale colour of the abdomen distinguishes it at a glance, besides the marked differences in the form of the caput and structure of the palpi.

ERIGONE CAPITO (Westr.). (Plate XXVIII. fig. 18.)

Adult male, length  $1\frac{1}{2}$  line.

The colour of the cephalothorax of this rare and remarkable Spider is a deep shining brown; the legs are orange-yellow, rather long, moderately strong, and furnished with hairs only; the palpi are similar in colour, except the digital joints, which are dark brown; and the abdomen is black.

The fore part of the caput has a strong elevation, and is divided into two segments—the lower one (comprising the fore part of the caput proper) prominent and rather produced forwards, the upper



one springing from the occiput ; the latter elevation is oval, rounded, and projecting forwards, lies nearly close upon the lower one ; between them, however, there is a perceptible division, so that the junctional portion, at the occiput, forms only a kind of neck ; the clypeus retreats, and is hollow in its profile-line. Two eyes are placed near the fore side of the summit of the upper segment of the caput, and six (in three pairs) on the fore part of the lower segment, in the ordinary position. The *palpi* are moderately long, and not very strong, except the digital joint, which is large ; the radial joint is shorter than the cubital, but strong and spreading at its fore extremity, the upper part of which, on the inner side, is produced into a long, strong, curved apophysis, whose extremity is of a somewhat bifid form and directed outwards ; on the outer edge of the apophysis are one or two sharpish prominent points ; the palpal organs are well developed and prominent, with a strong, sharp-pointed, black spine, coiled in a circular form, near their extremity on the outer side.

An adult male was received for examination, in April 1872, from M. Eugène Simon, by whom it was found near Paris.

Believing this Spider to be the *E. capito* of Westring, I forwarded a drawing of the cephalothorax to Dr. T. Thorell (of Upsala), by whom the typical example, described by Westring ('*Aranæe Suecicæ*,' p. 213), was found in Sweden ; Dr. Thorell, in reply, confirms my conjecture as to its specific identity. Since that time, M. Simon has, in January 1874, kindly sent me another adult example of the same sex, found by himself at Bourg-d'Oisans, France.

ERIGONE HETEROGASTER, sp. n. (Plate XXIX. fig. 19.)

Adult male, length rather less than 1 line.

The *cephalothorax* is of a dark yellowish brown colour ; it is small in comparison with the size of the abdomen ; the occipital region is elevated into a large roundish knob-like eminence ; and on either side, at its fore part, separating it from the caput, is a large and deep horizontal oval excavation, almost perforating the base of the eminence ; these lateral excavations, like the corresponding ones in many other species, taper backwards, and run out near the hinder part of the occiput ; the ordinary converging grooves of the thorax are indicated by fine blackish lines and not very distinct roundish punctures ; the occipital eminence is smooth, glossy, and its upper and fore sides are furnished with a few short hairs ; the fore part of the caput, forming its lower and rather the smallest segment, is rather prominent, the clypeus retreating, and less in height than half that of the facial space, and its upper part is also furnished with some short hairs.

The *eyes* are small and tolerably equal in size ; they are in the usual four pairs ; those of the upper (or hinder) pair are placed widely apart (rather more than three diameters) on the fore part, at the upperside, of the occipital eminence ; those of each lateral pair are contiguous to each other, and placed rather obliquely on either side of the lower segment of the caput ; between the lateral pairs, and



in the same straight line, is the fore central pair, the eyes of which are rather larger than usual and not quite contiguous to each other; each of them is separated from the fore lateral on its side by a little more than the diameter of the latter. All the eyes form a quadrilateral figure, longer than broad, and its hinder side longer than its fore side.

The *legs* are moderate in length, their relative length being 4, 1, 2, 3; they are slender, of an orange-yellow colour, and sparingly furnished with short hairs.

The *palpi* are short, slender, and similar in colour to the legs; the cubital joint is of moderate length, gradually converging from its fore extremity to its hinder one; the radial joint is short, rather dilated, and has its fore extremity on the upperside produced into a longish, rather slender, nearly straight, slightly tapering, not very sharp-pointed apophysis, having the same general direction as the cubital joint; the digital joint is small, and of the ordinary oval form: the palpal organs are neither very prominent nor complex; they have a small black filiform coiled spine at their fore extremity, but otherwise they present no remarkable feature.

The *falces* are small, straight, nearly perpendicular, similar in colour to the cephalothorax, and armed with a few minute teeth towards the extremity on their inner surface.

The *maxillæ* and *labium* are of normal form, and similar in colour to the falces.

The *sternum* is of a deep brown colour, and its surface is marked with roundish punctures.

The *abdomen* is large, of broad oval form; along the middle of the fore half of the upperside is an oval coriaceous patch of a darkish yellow-brown colour; the hinder part of this patch is the most obtuse; on either side, and throughout its whole length, the abdomen is dilated, forming a kind of cushion, which rises above the central portion; these dilatations are of a dull yellowish whity-brown colour, obscurely mottled with largish spots of a deeper hue; the hinder part of the central portion is of a dull brownish colour, with some obscure, pale, transverse curved lines, perhaps visible only in spirit of wine. The spinners are enclosed in a sort of short, sheath-like case, split into several portions.

The adult female is rather larger than the male, but is similar in general form and colouring; the cephalothorax, however, has no trace of the occipital eminence; and the relative length of the legs is different, 1, 4, 2, 3; the abdomen has the same peculiarity of form, but not so marked in its character, and the oval coriaceous patch on the fore part of the upperside is wanting. The form of the genital aperture is characteristic (see *f*, fig. 19, Plate XXIX.).

An adult example of each sex of this very distinct species (which may be easily distinguished by the form of the abdomen alone) was received from M. Eugène Simon, by whom it was found at Morocco.

ERIGONE THORACATA, sp. n. (Plate XXIX. fig. 20.)

Adult male, length  $\frac{2}{3}$  of a line.

The *cephalothorax* of this species is of a deep brown colour; the

sides of the thoracic region are marked with numerous roundish punctures; and the fore part of the caput is bold and prominent, with a strong and pretty high eminence on its occipital portion; on each side of this eminence, at its fore part, just behind the lateral pairs of eyes, is a short, somewhat oval, indentation, running backward towards the occiput; the clypeus is rather full, but retreating, and slightly exceeds in height half that of the facial space; when looked at in front the occipital eminence is distinctly divided into two lobes by a longitudinal valley or indentation; these lobes (looked at from the same point) have a direction slightly divergent from each other. The fore side of the occipital eminence, as well as the upper part of the caput in front of it, is clothed with a few short prominent hairs.

The *eyes* are small and in the usual position; those of the hind central (or upper) pair are placed on the fore part of the summit of the occipital eminence, or one on each of the lobes into which it is divided; they are thus very widely separated from each other, and form a transverse line rather longer than that formed by the three other pairs, which are seated at the upper fore extremity of the caput itself; those of each lateral pair are slightly obliquely placed, and are contiguous to each other, the foremost being separated from the fore central eye nearest to it by the space of an eye's diameter; the eyes of the fore central pair are the smallest of the eight, but not quite contiguous to each other.

The *legs* are short, moderately strong, and of a yellow-brown colour, tinged with reddish; they are furnished with hairs and a very few slender erect bristles; and their relative length is 4, 1, 2, 3.

The *palpi* are of moderate length and strength; their colour is pale yellow-brown: the cubital joint is strong, its fore extremity much stronger than its hinder one, and it is also much longer than the radial joint; this latter is very short and weak, but has its fore extremity on the inner side produced into a longish, curved, tapering apophysis, whose point is directed outwards; and opposed to it is a small prominent, obliquely truncated projection, which springs from the outer side of the extremity of the joint; the digital joint is rather small, but of ordinary form; the palpal organs are prominent and rather complex, with a somewhat circularly curved, reddish brown spine connected with their fore extremity.

The *falces* are small, directed backwards, and armed with a few very minute teeth towards their extremities on the inner sides; their colour is similar to that of the cephalothorax.

The *maxillæ* and *labium* are similar in colour to the falces, and of normal character in other respects.

The *sternum* is of ordinary form, but very convex; and its surface, though glossy, is thickly covered with small, round, shallow punctures; its colour is similar to that of the cephalothorax.

The *abdomen* is of tolerable size, not particularly convex above, but projects closely and considerably over the base of the cephalothorax; its upperside is completely covered by a dark, rich yellow-brown, coriaceous epidermis, pretty thickly marked with roundish

punctures, and clothed thinly with short hairs; the sides (below the coriaceous epidermis of the upper part) are yellowish, marked with indistinct longitudinal bars of a blackish hue; the spiracular plates, and a portion of the surface surrounding the spinners, are of a red-brown colour, the rest of the underside being coloured like the sides.

The *adult female* is rather larger than the male, and wants the occipital eminence, the coriaceous epidermis of the abdomen is of a similar nature, but does not extend so far backward. The genital aperture is, as usual, of characteristic form (see *d*, fig. 20).

This species is nearly allied to *Erigone nemoralis* (Bl.); but the male may be at once distinguished by the strongly bilobed form of the occipital eminence, this peculiarity being scarcely perceptible in that species; another closely allied species also—*E. pavid*a (Cambr.), found in Palestine—may be distinguished by the perfectly confluent form of the upperside of the occipital eminence; and from both these species the present one differs in the form of the palpi and structure of the palpal organs.

An adult example of each sex was received from M. Eugène Simon, by whom they were found near Troyes, France.

ERIGONE CORRUGIS, sp. n. (Plate XXIX. fig. 21.)

Adult male, length rather under 1 line (about  $\frac{1}{1\frac{2}{3}}$  of an inch).

The colour of the *cephalothorax* of this Spider is yellow-brown; the thoracic region suffused with dusky blackish, and the lateral margins edged with black; the *sternum* is rather darker, while the *falces*, *maxillæ*, and *labium* are similar to the *cephalothorax* in colour, the legs and palpi being pale yellow. The *caput* has its fore part full, bluff, and rounded; on the upperside towards the occiput is a tolerably strong eminence, of a somewhat bent form (looked at in profile), and directed forwards; this is caused by a strong indentation or excavation in front at its lower part where the *caput* proper begins; this excavation is a good deal obscured by numerous short bristly hairs, which, springing from the fore part of the eminence as well as from the *caput* below, meet across it. A considerable portion of the upperside of the fore part of the *caput* is clothed with short hairs, including the two lateral as well as the lower central pair of eyes. There are also two longish erect bristly hairs in the median line of the upper part of the *cephalothorax*—one at the base behind the occipital eminence, the other at the thoracic junction.

The *eyes* are small, in the ordinary position; those of the upper pair, separated from each other by no more than an eye's diameter, are placed in front on the upperside of the occipital eminence; those of each of the other three pairs, respectively, are contiguous to each other, and placed in a transverse straight line comprising the whole width of the fore part of the *caput* just below the gap between it and the occipital eminence; the eyes, looked at from the front, thus form a subtriangular figure, whose base is longer than a perpendicular line let fall upon it from the obtuse angle formed by the upper pair of eyes; the height of the *clypeus* exceeds half that of the facial space.



The *legs* are of tolerable length, slender, thinly furnished with hairs and fine bristles, of which last there are several short erect ones on the uppersides of the tibial joints; they are not very different in length; but those of the third pair are the shortest.

The *palpi* are of moderate length; the cubital joint is longer than the radial, and its fore part is stronger than its hinder extremity; the radial joint is short but strong, and the fore extremity on the upperside is produced into a long strong, somewhat bent, apophysis, the extremity of which terminates in a hook whose point is directed outwards; the radial joint, together with its apophysis, rather exceeds the cubital joint in length; the digital joint is of moderate size, and oval form; the palpal organs are prominent, complex, and have a slender, coiled, filiform spine at their extremity.

The *falces* are small, rather divergent, strongly inclined backwards towards the sternum, and armed towards their extremity on their inner sides with minute teeth.

The *maxillæ*, *labium*, and *sternum* are normal in form.

The *abdomen* projects considerably over the base of the cephalothorax; it is of an oval form, and moderately convex above; its colour is black, with some mottlings and chevron-like markings visible (perhaps only) in spirit of wine, and of a yellowish colour; it is thinly clothed with hairs, and the hinder part of the upperside is transversely wrinkled, the folds of the epidermis being rather marked and characteristic.

The adult female resembles the male in general characters, and also in the transverse folds of the hinder part of the upperside of the abdomen (these, however, are fewer in number than in the male); but the colours are darker, the legs being shorter, stouter, and tinged with orange-red. The cephalothorax is of ordinary form, no traces of the cephalic eminence being visible, the eyes being consequently more closely grouped together, and the relative position of the different pairs altered; the clypeus is rounded and prominent; the occiput has also a very slight shining convexity, and immediately behind it is a largish dark blackish patch, from which obscure blackish lines radiate, indicating the normal grooves and indentations. The genital aperture is characteristic (fig. 21, *f*).

An adult example of each sex was received from M. Eugène Simon, by whom they were found in Corsica. It is a very distinct species, bearing some resemblance to *Erigone fuscipes* (Bl.), but perhaps more nearly allied to *E. fastigata* (Bl.).

ERIGONE BIVATA, sp. n. (Plate XXIX. fig. 22.)

Adult male, length  $\frac{3}{4}$  of a line.

The whole of the fore part of this Spider, both above and underneath, is of a pale straw-colour. The cephalothorax strikes one at once as very similar to that of *E. bifrons* (Bl.); the fore part of the caput is broad, boldly rounded below and elevated above, being divided longitudinally by a deepish valley into two somewhat oviform lobes; a large deep oval excavation, narrowing to a point at the occiput, divides the lobes on either side from the lower part of the



caput; and within the excavation at its larger end, just behind the hind lateral eye, is a shining, silvery, roundish spot; the clypeus is full and prominent, its height appearing slightly to exceed half that of the facial space; a few short hairs directed downwards are disposed on the space between the fore and hind central pairs of eyes.

The *eyes* are very minute, but disposed in the usual four pairs, and seated on black spots; those of the upper or hind central pair appear to be the smallest of the eight; they are seated just in front of the summit of the cleft which divides the two lobes of the caput, and each is about an eye's diameter on one side of a dark, yellow-brown, longitudinal line running along the bottom of the cleft; the other three pairs of eyes are in a nearly straight transverse line at the upper part of the lower segment of the caput; those of the fore central pair are rather larger than those of the hind central, contiguous to each other, dark-coloured, and forming a line not quite as long as those of that pair. The eyes of each lateral pair are placed obliquely, but not quite contiguous to each other, the fore laterals being the largest of the eight, and each is separated by about a diameter's distance from the eye nearest to it of the fore central pair; the distance between the fore and hind central pairs is about equal to that from between the eyes of one lateral pair to between those of the other; looked at in front the fore laterals and fore centrals form a straight transverse line.

The *legs* are moderate in length and strength; their relative length apparently 4, 1, 2, 3, though the difference between those of the first and fourth pairs is exceedingly small; they are furnished with hairs; and each has one or two short prominent dark bristles on the uppersides.

The *palpi* are rather short and slender; the cubital is longer but less strong than the radial joint: this latter has its fore extremity on the upperside rather expanded, with two small prominent points, or the fore extremity may be described as having its upper margin emarginated; the digital joint is small, and the palpal organs prominent and well-developed, but not very complex, with a minute curved, dark, filiform tapering spine at their extremity. The *maxillæ*, *labium*, and *sternum* present no unusual feature either in form or structure.

The *falces* are moderate in length and tolerably strong; they are inclined backwards to the labium, and are armed with a few small sharp teeth towards the extremity on their inner margins.

The *abdomen* is of ordinary form, and projects (but not greatly) over the base of the cephalothorax; it is of a dull brownish yellow colour, a large oval patch at the hinder extremity on the upperside being pale luteous (this may, however, be accidental) and thinly clothed with hairs.

Although allied to *E. bifrons* (Bl.), it may easily be distinguished by the greater development and wider spread of the ovate lobes of the caput, as well as by a totally different position of the eyes, which are much smaller, and by a different colouring of the whole

Spider; the form and structure of the palpi and palpal organs are also different.

A single adult male was received from M. Simon, by whom it was captured at Rouen.

*ERIGONE BUCEPHALA*, sp. n. (Plate XXIX. fig. 23.)

Adult male, length  $1\frac{1}{4}$  line; length of the female  $1\frac{1}{2}$  line.

The *cephalothorax* is of a bright reddish orange-yellow colour, the caput being strongly tinged with brown; the thorax is covered with dark, conspicuous punctures, disposed mostly in converging lines, which follow the course of the normal indentations; towards the margins these punctures are less regularly placed: the caput is elevated and prominent; the fore extremity, being the upper portion of the clypeus, projects forwards in a bold, obtuse, nose-like form, slightly bent downwards; and on the occiput is a large, almost globular eminence, deeply cut away or indented on either side of the fore part at its base, the indentation extending backwards for about half its width; the upper part of this eminence has a few short erect hairs on its smooth and glossy surface; and some more conspicuous hairs are also disposed along the middle of the ocular area in a longitudinal direction; those above the indentations are directed downwards, those below upwards; the lower part of the clypeus is strongly retreating.

The *eyes* are in the usual four pairs; and in this species the pairs are rather widely separated from each other—one pair (in a transverse line) on the fore part of the top of the globular eminence, about two diameters distance from each other, another pair on either side, a little below the indentation which divides the eminence from the lower segment of the caput; the eyes of each of these pairs are on a small tubercular eminence respectively, and are contiguous to each other: the fourth pair is placed just at the commencement of the nose-like prominence; these are the smallest of the eight, dark-coloured, and are very near, if not contiguous, to each other: the ocular area is thus very large, its length also being greater than its breadth.

The *legs* are moderate in length and strength, their relative length appearing to be 4, 1, 2, 3; they are of a bright orange-yellow colour, tinged with reddish, and are furnished with hairs and a very few fine erect bristles; these last are more conspicuous in the female, being of a spinous nature.

The *palpi*, except the radial and digital joints, which are dark brownish-yellow, are similar in colour to the legs; they are moderately long, but strong, the humeral and cubital joints being very nearly as strong as the femora of the first pair of legs: the cubital is long, strong, bent downwards, and slightly larger at its fore than at its hinder extremity: the radial is exceedingly short, and not nearly so broad as the fore extremity of the cubital joint; it has its fore extremity on the upperside produced into a longish apophysis, whose extremity is emarginate or bifid, the outer limb of the bifid portion being prominent, sharpish-pointed (with a short, spine-

like hook, not easily seen, at its extreme point), and much longer than the other; from the outer side of the radial joint there issues a short, slightly curved, tapering, sharp-pointed, blackish spine; the whole length of the radial joint and its apophysis is less than that of the cubital: the digital joint is rather large, somewhat roundly truncate at its hinder extremity: the palpal organs are very prominent, highly developed and complex; at their base, near the outer side, is a circularly curved, reddish spiny process; about the middle of their outer side is a large, somewhat globular, whitish corneous lobe, in front of which is a circularly curved, black, flattish spine, its prominent extremity obtuse and bifid; and within its curvature is a prominent, obtuse, corneous process.

The *falces* are rather weak, but of moderate length, and similar to the cephalothorax in colour.

The *maxillæ* are strong, of normal form, and, with the *labium*, similar in colour to the falces.

The *sternum* is of a reddish orange-yellow colour, and its surface is covered with punctures similar to those on the thorax.

The *abdomen* is large, oval, and projects considerably over the base of the cephalothorax; it is moderately convex above, and clothed with short bristly hairs; the sides and hinder part are longitudinally rugulose, blackish, with yellowish-brown between the wrinkles; and the upperside is covered with a coriaceous epidermis of a deep blackish bistre-brown colour, thickly set with punctured spots.

The *female* is rather larger than the male, but resembles it in colours and general characters, the thorax and sternum being similarly punctured, and the upperside of the abdomen also covered with a coriaceous punctured epidermis; the occiput is roundly gibbous; and the eyes (as in all other females of this group) more closely massed together; those of the hind central pair being but one diameter's distance from each other; the form of the genital aperture is, as usual, characteristic, being of a somewhat triangular shape.

An adult example of each sex was received, in January 1872, from M. Simon, by whom they were found in Corsica.

ERIGONE PROTUBERANS, sp. n. (Plate XXIX. fig. 24.)

Adult male, length nearly  $1\frac{1}{4}$  line.

This Spider is allied to *E. latifrons* (Camb.); but its caput is less distinctly divided into two segments by a longitudinal indentation over the summit of its elevated portion. The clypeus, whose height is half that of the facial space, is furnished with some hairs just below the fore central pair of eyes; the space clothed with hairs is defined by being rather darker than the rest; the palpal organs are complex, and, besides several irregular corneous processes, a sharp-pointed, strongish, filiform spine issues from their extremity on the outer side, and, curving upwards and backwards, has its sharp point near their centre, more than halfway towards the hinder extremity of the digital joint and below the hinder part of the radial joint; this joint is strong though shorter than the cubital, and



has the whole width of its fore extremity on the upperside produced into a remarkably strong apophysis, whose extremity on the inner side is rounded and sharply curved, with its sharp corneous, somewhat beak-like point directed outwards.

The colour of the cephalothorax is dark yellowish brown, paler on the upper part of the caput, the legs and palpi being tinged with a brighter yellow-hue.

The *falces*, *maxillæ*, and *labium* are similar in colour to the cephalothorax; the *sternum* is black-brown, and the *abdomen* black.

A single example was received for examination from M. Eugène Simon, by whom it was found on the Pyrenees in the autumn of 1872. The above description, though short, will with the figures given, suffice to distinguish this Spider from its congeners.

ERIGONE CASTELLANA, sp. n. (Plate XXIX. fig. 25.)

Adult male, length 1 line.

The *cephalothorax* of this exceedingly remarkable species is of a yellow-brown colour, rather suffused with blackish brown on the thoracic portion, the normal grooves and indentations being also indicated by converging blackish lines. The caput is elevated, and has upon its summit a distinct elevation of large and disproportionate dimensions, and of a clearer and rather paler colour than the rest of the cephalothorax; looked at from the front it has a somewhat balloon-shaped appearance, and in profile it is somewhat flattened in front and globular behind, and the whole has a backward direction; the front is not only flattened, but strongly and deeply indented. Had it not been for the symmetrical form of this indentation, I should have considered it to have been the result of accident; whether or not it be normal can only be certainly proved by the examination of other examples; but after carefully examining the only example before me I am inclined to believe it to be a constant character. This curious "supercephalic" eminence has a somewhat bladder-like, semidiaphanous appearance, as if destitute of the solidity of the ordinary cephalothoracic surface, and is thinly clothed with fine prominent hairs: when looked at in profile, the supercephalic elevation has, close above its junction with the ordinary eminence of the caput, a deep depression, with a somewhat semicircular perforation at its deepest part: whether this perforation is complete or not it was difficult to ascertain with certainty; but it appeared to be so.

The *eyes* are seated in the usual four pairs on the ordinary cephalic elevation; one pair on the summit, close on either side of the perforation above noticed; below these, on either side in an oblique line, whose lower end is directed forwards, is each lateral pair, the eyes of which are contiguous; and considerably above the straight line of the lateral pairs is the fore central pair, the eyes of which are smallest of the eight, obscure, dark, and not quite contiguous to each other.

The *legs* are moderately long, slender, of a dull orange colour, furnished with hairs; their relative length 4, 1, 2, 3; the femora of the first and second pairs have on their fore sides a few spines



(in a single longitudinal row) of graduated lengths and strength, the longest and strongest being furthest from the fore extremity of the joint; some short bristles continue this row of spines towards the hinder extremity: these spines are very characteristic, being unusual in Spiders of this group of the genus.

The *palpi* are moderate in length and strength, and similar in colour to the legs. The cubital joint is slightly bent and rather clavate, or larger at its fore than at its hinder extremity; the radial joint is shorter and less stout than the cubital, and has its fore extremity on the upperside produced into an apophysis with a forked or bifid termination, the outer limb of the bifid part being of a tapering form, prominent, and very slightly but sharply hooked at its point, while the inner limb is shorter and depressed (it requires some care in examination to see this bifid portion correctly); the digital joint is of moderate size, and roundish oval form; the palpal organs are well developed and complex, with various corneous processes, one, at their fore extremity, being jet-black and of a somewhat T-like form.

The *falces* are small, rather divergent, and similar in colour to the supercephalic eminence.

The *maxillæ* and *labium* are of normal character, and, with the *sternum*, which is very glossy and convex, of a dark yellow-brown colour—the extremities of the maxillæ and labium being pale, and the sternum being the deepest in hue, and furnished with a few long bristle-like hairs.

The *abdomen* is large, much longer than the cephalothorax, moderately convex above, and of a jet-black colour; its surface appeared to be, on the lower part of the sides and behind, somewhat longitudinally rugulose; it is clothed very sparingly with short yellowish hairs.

The *female* resembles the male in colours; but the caput is much less elevated, and the supercephalic eminence is represented by a very slight occipital gibbosity. The legs of the first and second pairs have the same characteristic spines on the femoral joints; there are also other slender erect spines on the uppersides of the genual and tibial joints of all the legs; the genital aperture is of characteristic form, presenting, when looked at from the front, a double-arched aperture.

An adult example of each sex of this curious Spider was received in 1872 from M. Eugène Simon, by whom it was found at Aranjuez, in Spain.

ERIGONE JUSTA, sp. n. (Plate XXIX. fig. 26.)

Adult male, length 1 line.

The *cephalothorax* of this Spider is dark yellowish brown, with some rather irregular, vein-like, converging black markings on the thorax, the lower part of whose sides have a roughened or somewhat granular appearance; the fore part of the caput is elevated into a single eminence, of a somewhat obtuse subconical form, of moderate height, the summit being clothed with short bristly hairs directed

backwards: the height of the clypeus, whose profile-line is rather curved, equals about two thirds of that of the facial space.

The *eyes* are placed in the usual four pairs:—one pair on the summit of the cephalic eminence, not easy to be seen except by looking down upon them; these are about a diameter's distance or rather more from each other; those of each lateral pair are contiguous to each other and placed towards the base of the eminence and about midway between its fore and hinder part; those of the fore central pair are smallest of the eight, dark-coloured and contiguous to each other, and each is separated from the fore lateral eye on its side by an interval about equal to the diameter of the latter: the area formed by the eyes is of a subtriangular or rather of an equilateral triangular form, the hinder angle being truncated by the line formed by the hinder (or upper) pair of eyes.

The *legs* are slender, but moderate in length, their relative length being 4, 1, 2, 3; the femora of the first pair have three small, rather prominent black spines of different lengths in a longitudinal line underneath their fore extremities; the legs are of a dull yellow colour and, except the above-mentioned spines and a corresponding bristle or slenderer spine in a similar situation on the femora of the other legs, are furnished with hairs, only one or two very slender erect ones being on the uppersides.

The *palpi* are similar in colour to the legs, short and not strong; the radial joint is rather shorter but stronger than the cubital, and has its fore extremity on the upperside produced into a short rather blunt-pointed apophysis, whose extremity (looked at in profile) appears to be more sharply pointed and slightly hooked; on the inner side of this apophysis is an angular depressed point, which, in some views of it, gives the extremity of the radial apophysis a bifid appearance: the digital joint is of moderate size and ordinary form: the palpal organs are moderately complex, with a short stout, somewhat corkscrew-shaped, blunt-pointed, black spine at their extremity, and a curved corneous process at their base on the outer side.

The *falces* are small, short, and rather paler in colour than the cephalothorax.

The *maxillæ* and *labium* are of normal form, and of a deep black-brown colour, paler at their extremities.

The *sternum* is similar in colour to the maxillæ, and is of ordinary form, but very convex.

The *abdomen* is rather large, tolerably convex above, and projects strongly over the base of the cephalothorax; its colour is black-brown; and it is clothed thinly with hairs.

An adult male of this Spider, which is allied to *E. frontata* (Bl.), was received from M. Simon, by whom it was found at Troyes in France.

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## EXPLANATION OF THE PLATES.

## PLATE XXVII.

- Fig. 1. *Erigone retroversa* ♂.  
*a*, profile of cephalothorax, with legs and palpi truncated; *b*, front view of caput and falces; *c*, right palpus, from inner side in front; *d*, left palpus, from outer side; *e*, natural length of Spider.
2. *Erigone consimilis* ♂.  
*a*, profile, with legs and palpi truncated; *b*, front view of caput and falces; *c*, right palpus, from outer side; *d*, leg of first pair; *e*, natural length of Spider.
3. *Erigone longiuscula*.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, caput, from behind; *d*, left palpus, from inner side in front; *e*, natural length of Spider.
4. *Erigone truncatifrons* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, left palpus, from the front; *d*, ditto, from outer side; *e*, natural length of Spider.
5. *Erigone habilis* ♀.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, genital aperture; *d*, natural length of Spider
6. *Erigone dorsuosa* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, left palpus, from behind and rather above; *d*, right palpus, from outer side; *e*, natural length of Spider.
7. *Erigone antennata* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the

front; *e*, portion of left palpus, from outer side; *d*, right palpus, from outer side; *c*, natural length of Spider.

Fig. 8. *Erigone vaporariorium* ♂ & ♀.

*a*, profile of ♂, with legs and palpi truncated; *b*, caput and falces of ♂, from the front; *c*, fore part of caput (♂), from behind; *d*, right palpus (♂), from the front; *e*, natural length of Spider; *f*, genital aperture (♀).

9. *Erigone corniculans* ♂ & ♀.

*a*, profile of cephalothorax (♂), with legs and palpi truncated; *b*, upper part of caput, from above; *c*, right palpus, from above and behind; *d*, apophysis at extremity of radial joint; *e*, genital aperture (♀); *f*, natural length of ♂; *g*, right palpus of *Erigone monoceros*, Wider, from above and behind.

#### PLATE XXVIII.

10. *Erigone nigrolimbata* ♂ & ♀.

*a*, profile (♂), with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, right palpus (♂), from outer side in front; *d*, digital joint (♂), from the front; *e*, genital aperture (♂); *f*, natural length of ♂.

11. *Erigone lepricuri* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, right palpus, from outer side; *d*, part of left palpus, from the front; *e*, radial joint of right palpus, from outer side; *e'*, tooth-like spine beneath extremity of radial apophysis; *f*, natural length of Spider.

12. *Erigone stylifrons* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, left palpus, from the front; *d*, right leg of first pair, from outer side; *e*, one of the bent spines in centre of ocular area; *f*, natural length of Spider.

13. *Erigone eboroduncensis* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, right palpus, from outer side; *d*, left palpus, from the front; *e*, natural length of Spider; *f*, right palpus, from above and behind.

14. *Erigone eoccinea* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, outline of part of left palpus, from the front; *d*, right palpus, from outer side; *e*, natural length of Spider.

15. *Erigone foraminifera* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, right palpus, from above and behind; *d*, natural length of Spider.

16. *Erigone lucasi* ♂.

*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, left palpus, from above and behind; *d*, right palpus, from outer side in front; *e*, natural length of Spider.

17. *Erigone inedita* ♂ & ♀.

*a*, profile (♂), with legs and palpi truncated; *b*, caput (♂), from the front; *c*, right palpus, from above and behind; *d*, outline of part of left palpus, from outer side; *e*, genital aperture (♀); *f*, natural length of ♂.

18. *Erigone capito* (Westr.) ♂.

*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, left palpus, from outer side; *d*, natural length of Spider.

#### PLATE XXIX.

19. *Erigone heterogaster* ♂ & ♀.

*a*, profile (♂), with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, abdomen (♂), from above and behind; *d*, *e*, left palpus (♂), from two points of view, on inner side; *f*, genital aperture of ♀; *g*, natural length of ♂.



- Fig. 20. *Erigone thoracata* ♂ & ♀.  
*a*, profile (♂), with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, left palpus (♂), from inner side and rather in front; *f*, ditto, from outer side; *d*, genital aperture (♀); *e*, natural length of Spider (♂).
21. *Erigone corrugis* ♂ & ♀.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, right palpus (♂), from outer side and rather in front; *d*, ditto, from above and behind; *e*, natural length of Spider (♂); *f*, genital aperture of ♀.
22. *Erigone biovata* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, caput, from above and behind; *d*, left palpus, from the front; *e*, part of right palpus, from outer side; *f*, natural length of Spider.
23. *Erigone bucephala* ♂ & ♀.  
*a*, profile (♂), with legs and palpi truncated; *b*, caput (♂), from the front; *c*, left palpus (♂), from above and behind; *d*, genital aperture (♀); *e*, natural length of ♂.
24. *Erigone protuberans* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, right palpus, from inner side; *d*, left palpus, from rather on inner side in front; *e*, natural length of Spider.
25. *Erigone castellana* ♂ & ♀.  
*a*, profile (♂), with legs and palpi truncated; *b*, caput (♂), from the front; *c*, upper part of caput (♂), from behind; *d*, right palpus (♂), from outer side, above and in front; *e*, genital aperture (♀); *f*, natural length of ♂.
26. *Erigone justa* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, ditto, above and in front; *d*, part of right leg of first pair, from outer side; *e*, right palpus, in front and rather on the inner side; *f*, left palpus, from outer side; *g*, natural length of Spider.

3. Second Report on Collections of Indian Reptiles obtained by the British Museum. By Dr. ALBERT GÜNTHER, F.R.S., V.P.Z.S.

[Received March 1, 1875.]

(Plates XXX.—XXXIV.)

The following notes are taken from specimens collected by Lieut.-Col. Beddome in Southern India, and by the late Dr. Jerdon in Northern India and the Himalayas. Besides descriptions of some new species, I have made some short remarks on others recently named and described—not with the object of correcting nomenclature, but rather with the view of inviting the authors of those species to reconsider the characters on which they have based them. The Batrachians will be treated of in a separate paper.

Lieut.-Col. Beddome's collection contained all the specimens obtained by him during his residence in India, more especially the types of the numerous interesting forms discovered and described by him. Perhaps there is now no other part of India the reptilian fauna of which is better known than the district explored by this indefatigable collector.

When Dr. Jerdon left India, he had the intention of publishing a

- Fig. 20. *Erigone thoracata* ♂ & ♀.  
*a*, profile (♂), with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, left palpus (♂), from inner side and rather in front; *f*, ditto, from outer side; *d*, genital aperture (♀); *e*, natural length of Spider (♂).
21. *Erigone corrugis* ♂ & ♀.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces (♂), from the front; *c*, right palpus (♂), from outer side and rather in front; *d*, ditto, from above and behind; *e*, natural length of Spider (♂); *f*, genital aperture of ♀.
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24. *Erigone protuberans* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput and falces, from the front; *c*, right palpus, from inner side; *d*, left palpus, from rather on inner side in front; *e*, natural length of Spider.
25. *Erigone castellana* ♂ & ♀.  
*a*, profile (♂), with legs and palpi truncated; *b*, caput (♂), from the front; *c*, upper part of caput (♂), from behind; *d*, right palpus (♂), from outer side, above and in front; *e*, genital aperture (♀); *f*, natural length of ♂.
26. *Erigone justa* ♂.  
*a*, profile, with legs and palpi truncated; *b*, caput, from the front; *c*, ditto, above and in front; *d*, part of right leg of first pair, from outer side; *e*, right palpus, in front and rather on the inner side; *f*, left palpus, from outer side; *g*, natural length of Spider.

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G.H. Ford.

CALOTES GRANDISQUAMIS.

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A



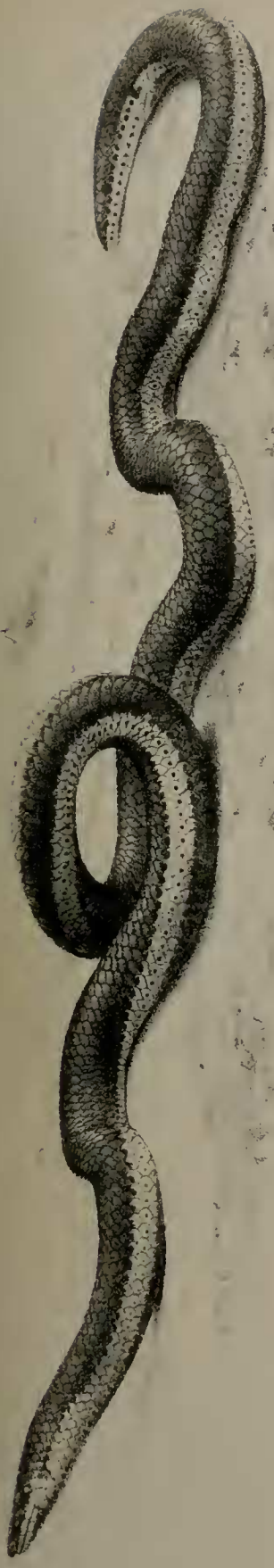
B



A. SILYBURA MELANOGASTER. B. SILYBURA LIURA



A.



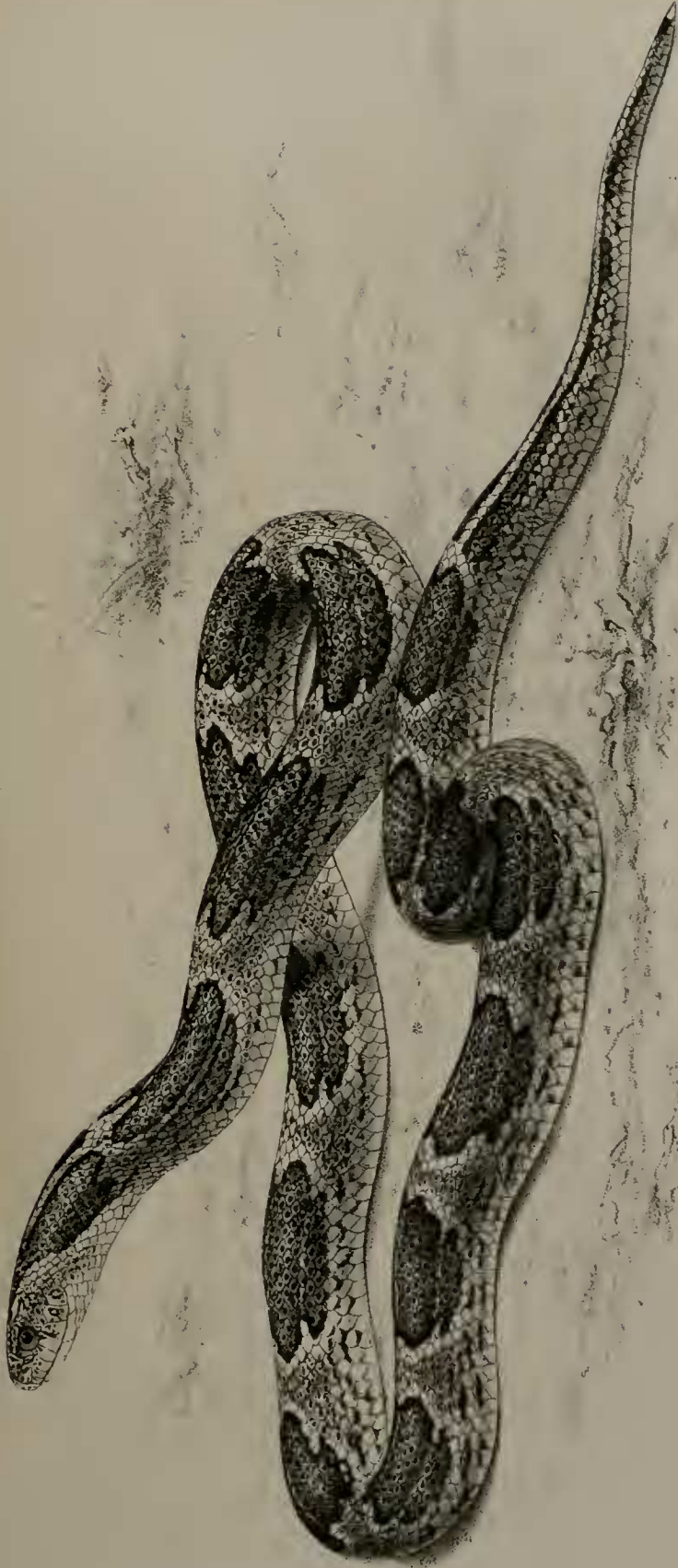
B.



A. MELANOPHIDIUM BILINEATUM. B. MELANOPHIDIUM PUNCTATUM.

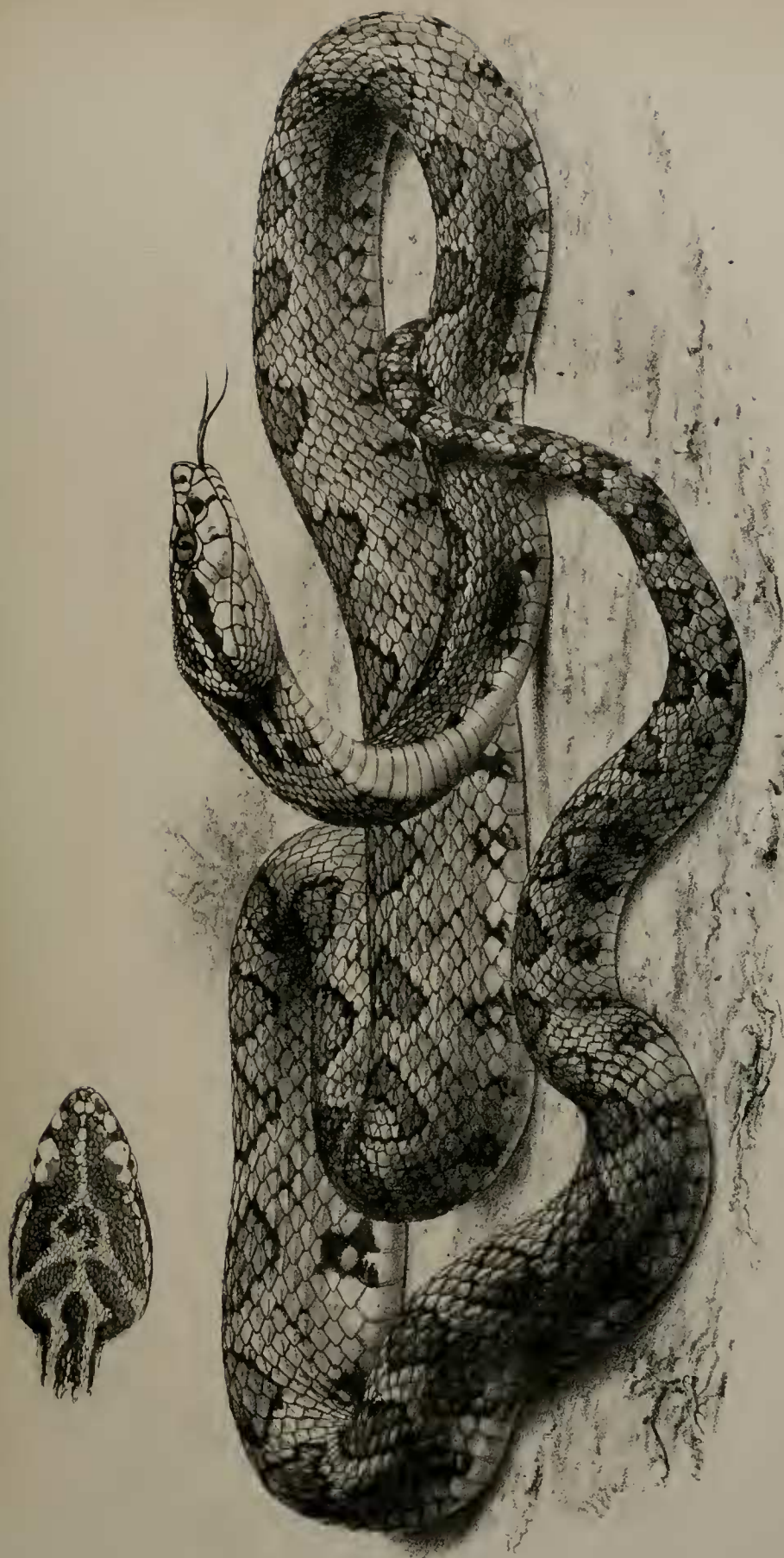






SIMOTES SPLENDIDUS.





Muttern. Bros imp

TRIMERESURUS JERDONII

G. H. Ford

volume on Indian reptiles similar to his works on the Mammals and Birds of India. To obtain a collection of Himalayan reptiles, with which he was least familiar, he undertook a journey into the Himalayas and Khassya. He collected a considerable number of specimens, which he brought with him to England and presented to the Trustees of the British Museum. The work of systematically arranging and naming this collection was carried on jointly by him and myself, and had proceeded as far as the genus *Tropidonotus*, when it was interrupted by the illness from which he never recovered. Being able to trust to his wonderful memory, he had not always taken the precaution of labelling the specimens with the locality where he obtained them; and I am therefore ignorant of the habitat of a part of the specimens which were still unexamined at the time of his death.

CABRITA BRUNNEA, Blanford, Journ. As. Soc. 1870. p. 335.

Seven specimens from various localities, collected by Mr. Blanford and Col. Beddome, do not seem to me to differ from *C. leschenaultii*.

#### OPHIOPS.

To this genus I refer:—

1. OPHIOPS JERDONII (Blyth) = *Cabrila jerdonii* (Bedd., Blanf.) = *Pseudophiops theobaldi* (Jerd. P. A. S. B. 1870, p. 71) = *Ophiops bivittatus* (Bedd.).

2. OPHIOPS BEDDOMII (Jerd. P. A. S. B. 1870, p. 71) = *Ophiops monticola* (Bedd. Madr. Journ. Med. Sc. 1870).

#### MOCOA TRAVANCORICA (Bedd.)

is represented by a series of specimens of different ages in Col. Beddome's collection; it is scarcely distinguishable from *M. bilineata* (Gray).

#### RISTELLA RURKII (Gray).

Specimens found by Col. Beddome in the Toracada valley (alt. 4000–5000 ft.) agree so well with the few notes by which this species has been characterized, that I am inclined to refer them to it. It is very distinct from *R. travancorica* (Bedd.).

#### EUPREPES BEDDOMII, Jerd. P. A. S. B. 1870, p. 73.

is not specifically distinct from *Tiliqua rufescens*.

#### EUPREPES (TILIQUA) BREVIS.

Eye lid scaly; a pair of supranasal shields; the præfrontal is broadly in contact with the rostral and vertical. The fifth upper labial is below the orbit and much longer than high. Opening of the ear of moderate width, without tubercles in front. Scales with three, and in adult specimens with five strong keels, in 29 longitudinal and 25 transverse series (the latter counted from the axil of the fore leg to the vent). Præanal and subcaudal scales not enlarged.



Body remarkably short, limbs of moderate strength. Brownish-olive above, sides black, lower parts greenish.

There were three specimens of this species in Col. Beddome's collection. The larger (which is adult) was obtained in the Anamallay Mountains, the two smaller ones in Travancore. The former is  $4\frac{1}{4}$  inches long, the body measuring  $1\frac{3}{4}$  inch.

#### HEMIDACTYLUS COCTÆI.

I have referred to this species:—

1. *Hemidactylus bengaliensis*, Anders. J. A. S. B. 1871, p. 14, of which I have examined a specimen sent by Dr. Anderson to Col. Beddome.

2. *Hemidactylus giganteus*, Stoliczka, J. A. S. B. 1872, p. 99, of which a specimen was given by Mr. Blanford to Col. Beddome.

3. *Doryura berdmorei* of Blyth and others, which appears to be founded on young examples of this species.

#### GECKO ANAMALLENSIS.

*Upper parts uniformly covered with rather coarse granulations, without larger tubercles*; scales of the middle of the abdomen in about 30 longitudinal series; no femoral or præanal pores; nine upper and seven lower labials; the front pair of chin-shields are smaller than the first lower labial. Tail slightly depressed, with a series of broad subcaudals. *Neither the fingers nor the toes are webbed.* No fold of the skin in the ham. Greyish brown above, clouded with darker.

A single specimen was found by Col. Beddome in the Anamallay Mountains; it is  $3\frac{1}{2}$  inches long, the body measuring  $1\frac{3}{4}$  inches.

#### GONIODACTYLUS WYNADENSIS.

*Gymnodactylus wynadensis*, Bedd. Madr. Journ. Med. Sc. 1870, = *G. maculatus*, Bedd. *ibid.*

#### GYMNODACTYLUS LITTORALIS (Jerd.),

= *Gymnodactylus planiceps*, Beddome, Madr. Journ. Med. Sc. 1871.

#### GYMNODACTYLUS GRACILIS (Bedd.)

is probably the lizard to which Mr. Jerdon had previously applied the name of *G. malabaricus*.

#### GYMNODACTYLUS NEBULOSUS (Bedd.).

I regard *G. nebulosus*, *collegalensis*, and *speciosus* of Beddome as varieties of colour of the same species.

#### CALOTES GRANDISQUAMIS. (Plate XXX.)

A single uninterrupted series of four or five spines above the tympanum, anteriorly passing into a row of scales which are larger than the others on the temple, and extend forward to the eye. Dorsal crest well developed, composed of compressed spines, long in the adult male, shorter in younger males and in the female; this crest

becomes lower posteriorly on the trunk, but is continued to the basal portion of the tail in the male, whilst it disappears behind the middle of the trunk in the female. *Scales on the side of the body exceedingly large*, nearly four times the size of those on the abdomen; a transverse series in the middle of the trunk is composed of not more than seven scales. A fold in front of the shoulder.

An immature male (body 4 inches long) is green, with five broad black cross-bands, each scale within the bands having an orange-coloured spot in the middle; tail with broad blackish rings; lips yellowish green.

In an adult male (body  $5\frac{1}{2}$  inches long) only traces of the two middle bands remain, nearly the whole of the upper parts being uniformly green; lips yellowish.

The adult female is uniform green.

Three specimens were found by Col. Beddome at the foot of the Canoot Ghat; the largest is 18 inches long, the body measuring  $5\frac{1}{2}$  inches.

#### ONYCHOCEPHALUS ACUTUS.

I do not find any character by which *O. malabaricus* (Beddome) can be distinguished from this species.

#### SILYBURA.

The following is a synopsis of all the species known, prepared with the assistance of the numerous examples in Col. Beddome's collection.

##### I. *Scales in nineteen rows.*

- A. Ventral scutes 205–214. Snout pointed; nasals not separated by the rostral. Caudal disk convex. Sooty black above, reddish below, the two colours encroaching upon each other in a zigzag line, and the black forming cross bars on the anterior part of the abdomen; a reddish spot on the cheek.

1. *Silybura grandis*

(Beddome): Anamallays, 4000 feet.

- B. Ventral scutes 166–169. Snout pointed; nasals separated by the rostral, which is about as long as the vertical. Head very small; vertical rather broad. Caudal disk more or less convex. Upper parts reddish violet or purplish, with irregular transverse rows of (sometimes very indistinct) yellowish ocellated specks. Abdomen deep black, this colour being separated from that of the upper parts by a yellow band commencing at the angle of the mouth, and broken up in spots behind, or entirely replaced by an irregular row of spots. A yellow band on each side of the lower part of the tail.

2. *S. melanogaster*, sp. n.  
(Plate XXXI. fig. A.)

Two specimens from the Anamallays and Travancore.

II. *Scales in seventeen rows.*A. *Number of ventral scutes exceeding 160.*a. *Caudal disk flat.*

Ventral scutes 164 s. 166 s. 170. Snout conical; rostral of moderate extent. Brownish black, a more or less regular broad red band runs along each side of the body. Abdomen either entirely black, or with black margins on the scutes . . . . . 3. *S. rubrolineata* (Beddome): Anamallays, Tinnevellys.

b. *Caudal disk convex.*

Ventral scutes 169–177; subcaudals 5–7. Snout acutely pointed; rostral shield long, but not separating the nasals; vertical small. Brown, with a narrow whitish line on the side of the neck; vent white, with scarcely a trace of a lateral band on the tail . . . . . 4. *S. beddomii* (Günth. Rept. Brit. Ind. p. 190): Anamallays, 3000 to 4500 feet.

Ventral scutes 167, subcaudals 10. Snout obtusely conical; rostral shield of moderate extent; vertical small. Brown, with a whitish line along each side of the neck. A very perfect white band along each side of the lower part of the tail, and crossing the vent . . . . . 5. *S. elliotti* (Gray, Proc. Zool. Soc. 1858, p. 262): Madras Pres.

Ventral scutes 193, 201, 203. Snout pointed; rostral short. Caudal disk rough with keels. Purplish, ornamented with transverse series of ocellated small spots . . 6. *S. ocellata* (Beddome, Proc. Zool. Soc. 1863, p. 226): Western slope of Nilgherries (3500 feet), Wynad.

Ventral scutes 183. Snout rather obtuse; rostral very short. Tail very convex above and without any keels. Purplish above, ornamented with transverse series of ocellated yellow small spots; abdomen (including the two outer rows of scales) yellow, with numerous irregular black cross bars; tail blackish, with some yellowish spots on each side.

7. *S. liura*, sp. n.

Malabar.

(Plate XXXI. fig. B.)

B. *Number of ventral scutes less than 160.*a. *Caudal disk flat; snout obtuse.*

Ventral scutes 139–148 (155 twice in 20 specimens). A sooty black is predominant on the upper, and yellowish on the lower parts; sometimes both colours are sharply confined to their respective regions (*S. nilgherriensis*); sometimes the entire animal is blackish; other specimens have the abdomen banded and spotted; and again, in others, the back is ornamented with various yellowish patterns, and the abdomen spotted with black (*S. shortii*).

8. *S. ceylonica*

(Cuv. R. An.) = *S. nilgherriensis* (Bedd. Proc. Zool. Soc. 1863, p. 226, pl. 26. fig. 1) = *S. shortii* (Bedd. l. c. p. 225, pl. 25. fig. 1): Bombay, Dekkan, Nilgherries, Shevaroyes.

Ventral scutes 130–135. Large blood-red spots on the sides of the neck, and one on each side of the vent.

9. *S. rubromaculata*

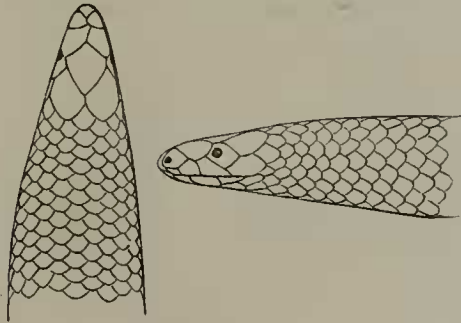
(Beddome).

Ventral scutes 135. A regular narrow yellow band runs along each side of the body . . . . . 10. *S. bicatenata* (Günth. Brit. Rept. p. 191, pl. 17. fig. H): Dekkan.

Ventral scutes 122–131. Vertical shield broad. Brown above, yellowish on the sides and below, irregularly spotted with brown; sometimes the upper part of the sides ornamented with short yellowish cross bars, which do not extend across the back . . . . . 11. *S. brevis* (Günth. Brit. Rept. p. 192, pl. 17. fig. D): Anamallays, Nilgherries.

Ventral scutes 128–130. Snout obtusely conical, narrow; rostral very short; hinder part of the vertical much produced. Brown above, lower parts yellow, with irregular

Fig. 1.



*Silybura arcticeps* (magn. 2 diameters).

black cross bars. Lower side of the tail yellow, black in the middle; terminal scute of the tail black.

12. *S. arcticeps*, sp. n.

Tinnevely.

b. *Caudal disk rounded; snout pointed.*

Ventral scutes 144–153. Black, upper parts dotted with white . . . . . 13. *S. punctata* (Beddome): Pulney hills, Golcondah hills.

PLECTRURUS CANARICUS.

*Silybura canarica*, Beddome.

This species differs from the other species of *Plectrurus* in having



the supraorbital and postorbital confluent; therefore the separation of these shields cannot be continued as a character of *Plectrurus*, which, however, is sufficiently distinguished by the vertically compressed terminal caudal scute.

*PLECTRURUS BREVIS* (Beddome),

= *P. perrotteti*, young.

*MELANOPHIDIUM BILINEATUM* (Bedd.). (Plate XXXII. fig. A.)

The coloration of the adult and young is perfectly the same, except that the lateral band and the lower side of the tail are pure white in the young, whilst in the adult a series of minute black dots runs along the middle of the lateral band, and the lower part of the tail is ornamented by two series of round black spots.

This species occurs in the Wynad, at an altitude of 4000–5000 ft.

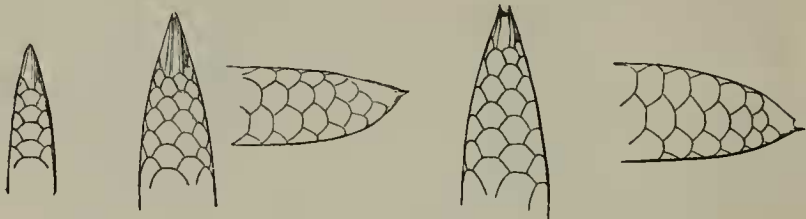
*MELANOPHIDIUM PUNCTATUM* (Bedd.). (Plate XXXII. fig. B.)

In this species the coloration of the adult and young is identical, the sides being ornamented sometimes by two, and sometimes by three longitudinal rows of black spots. But the terminal scale of the tail is subject to a remarkable change: in a specimen 12 inches long it is simply conical (fig. 2); in another, 17½ inches long, it is narrow, provided with two parallel ridges, each ending in a short spine (fig. 3); and, finally, in another of 18 inches, and much thicker

Fig. 2.

Fig. 3.

Fig. 4.



Magnified 2 diameters.

than the second, the terminal scute is compressed, with the ridges as in the second specimen, but with two pairs of short spines, one pair being vertically above the other (fig. 4).

The mental groove is equally developed in all these specimens and species.

This species is found in Travancore, at an altitude of 3000–5000 feet.

*ASPIDURA COPII*, Gthr.

We have received a second example of this species; it was obtained in the district of Dimbola, Ceylon.

*GEOPHIS STENORHYNCHUS*.

Similar in habit to *G. microcephalus*, but with fifteen series of scales. Rostral shield narrow and deep. The two anterior labials

and nasals are much reduced in size by the large loreal, and almost rudimentary. Anterior frontals very small, scarcely one fourth the size of the posterior. Vertical six-sided, as long as broad, with an obtuse anterior angle, and with very short supraciliary edges; supraciliary and postocular of equally small size. Five upper labials; the third and fourth enter the orbit, the fifth the largest. Temporals 1+2. Mental shield and the anterior lower labials nearly entirely suppressed by a pair of very large chin-shields; these are followed by another pair of small scale-like chin-shields, behind which is the first abdominal scute, which again is much enlarged. Ventrals 129-131; anal single; subcaudals 17-27. Uniform blackish above and below, with an indistinct buff collar.

Three specimens from Travancore in Col. Beddome's collection; the largest is only  $7\frac{1}{2}$  inches long, the tail measuring  $\frac{1}{2}$  inch.

This species agrees with *Platypteryx perrotteti* (D. & B.) in having the same number of rows of scales; but the pterygoid bones are scarcely more dilated than in *G. microcephalus*.

#### SIMOTES SPLENDIDUS. (Plate XXXIII.)

Scales in twenty-one rows. Each of the anterior frontals is broken up into two shields; so that there are four small shields in the same transverse row. Loreal distinct; two præoculars, the lower of which is much smaller than the upper; two or three postoculars; eight upper labials, the fourth and fifth of which form the lower part of the orbit; temporals irregular. Ventral shields 195; anal entire; subcaudals 42. Yellowish white, with sixteen large bluish grey spots on the back; each of these spots is of an oblong shape, indented in front and behind, with a black edge and surrounded with a bright yellow margin; each scale within the spot and with a black speck. The scales of the interspaces of the white ground-colour are irregularly speckled with blackish. A yellow line along the median line of the tail. The first spot on the neck is nearly entirely longitudinally divided by a yellow line, and is lance-shaped in front, the point of the lance resting on the vertical shield. The remainder of the head speckled with black. Lower parts white, with an irregular series of small squarish black spots along each abdominal edge.

A single example from the Wynad is in Col. Beddome's collection; it is 20 inches long, the tail measuring  $2\frac{1}{2}$  inches.

#### ABLABES ALBIVENTER.

Scales in fifteen rows. Two pairs of frontals. Loreal elongate; one præ- and two postoculars. Temporals 1+1; the occipital does not extend downwards to the lower postocular. Six upper labials, the third and fourth entering the orbit. Two pairs of chin-shields, the anterior being nearly twice the size of the posterior, and in contact with four labials. Ventrals 125; anal double; subcaudals 31. Brownish above; two or three narrow blackish lines along the outer series of scales; an indistinct light collar. Lower parts yellowish white.

Four examples from Darjeeling are in Dr. Jerdon's collection; the largest is 8 inches long, the tail measuring  $1\frac{1}{8}$  inch.

**TROPIDONOTUS MODESTUS.**

Scales in nineteen series, rather feebly keeled. Head narrow, though distinct from neck; eye of moderate size. Anterior frontals not pointed in front. Loreal nearly square; one præ- and three postoculars. Nine upper labials, the fourth, fifth and sixth entering the orbit. Temporals 1+1+2, the anterior in contact with the middle postocular. Maxillary teeth slightly increasing in size behind, and the last not separated from the preceding by an interspace. Ventrals 164-166; anal double; subcaudals 102. Dusky brownish ash-coloured above, with very indistinct small spots of a lighter or darker colour; the dark colour of the upper parts extends more or less over the scutes of the lower parts.

Two specimens from the Himalayas, presented by the late Dr. Jerdon; the largest is 19 inches long, the tail measuring  $4\frac{1}{2}$  inches.

**ACONTIOPHIS.**

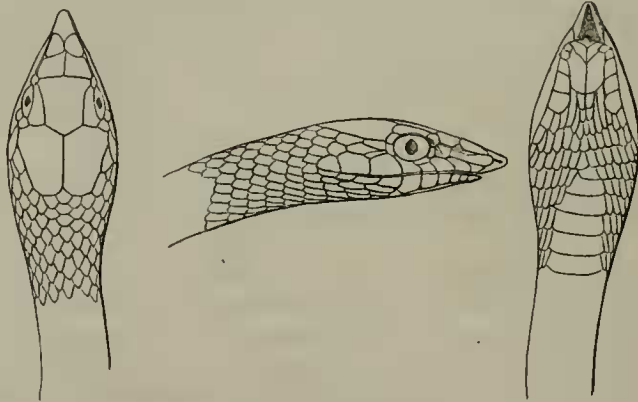
The position of the nostril of this snake is so peculiar, that it must be regarded as the type of a distinct family, *Acontiophidæ*, the place of which is near to the *Colubridæ*.

Snout acutely pointed, terminating in a rostral shield which has the shape of a four-sided pyramid, is deeply grooved below, and provided on each side with a longitudinal slit, the nostril, as in *Acontias*. The posterior maxillary tooth is longest, not grooved. Subcaudals two-rowed. Scales smooth, in nineteen rows.

**ACONTIOPHIS PARADOXA.**

The shields on the upper surface of the head are normal; the vertical being very broad, with concave lateral margins and an obtuse

Fig. 5.



Magnified 2 diameters.

posterior angle. The shield which is the homologue of the nasal in other snakes is elongate, smooth, not perforated, and distinct from the loreal. Three præ- and two postoculars. Eight upper labials,

the fifth only entering the orbit. Ventrals 187; subcaudals 44. Pupil vertical. Whitish, with a vertebral series of large subquadrangular square spots; a dark-brown horizontal stripe behind the eye; and a spot of the same colour below the eye. Lower parts whitish.

A single specimen, 12 inches long (tail  $1\frac{1}{2}$  inch), is in the late Dr. Jerdon's collection. It is rather shrivelled; and unfortunately no record as regards the locality where it was found was placed on the bottle. He obtained it probably within the Himalayan region or in Khassya.

#### DIPSAS NUCHALIS.

Allied to *D. gokool*, but with a widely different coloration. Scales in twenty-one series, those of the vertebral series much enlarged, subhexagonal. Ventrals 233-242; anal single; subcaudals 90. Eye of moderate size. Loreal square; one præocular, just reaching the upper surface of the head; two postoculars. Eight upper labials, the third, fourth, and fifth of which enter the orbit. Temporals 2+3+3; a small odd temporal is intercalated between the anterior temporals and the postoculars. Upper parts light purplish brown, with a vertebral series of brown transverse spots which gradually become indistinct towards the middle of the length of the body, and further on disappear entirely. The first spot on the neck is a narrow transverse bar. An oblique narrow black temple-streak. Upper parts of the head nearly uniform brown. Lower parts yellowish, densely powdered with purplish brown.

Several specimens were found by Col. Beddome in the forests on the western coast of Malabar; the largest is 44 inches long, the tail measuring 10 inches.

#### OPHITES SEPTENTRIONALIS.

Scales in seventeen rows, only those in the middle of the back feebly keeled. Ventrals 214; anal single; subcaudals 83. Anterior frontals short, much broader than long; vertical five-sided, rather longer than broad. Nostril wide, situated between the two nasals, the anterior frontal, and the first labial. Loreal narrow, much longer than deep. One præocular just reaching the upper surface of the head; two postoculars; eight upper labials, the third, fourth, and fifth entering the orbit. Temporals 2+3. Black, trunk with thirty narrow white rings, only about two scales wide; the first at some distance behind the head. Lower parts white; subcaudals marbled with black.

One specimen from the late Dr. Jerdon's collection, without indication of its habitat. But there is no doubt that he obtained it during his last journey through the northern parts of India. It is 3/ 33 inches long, the tail measuring 8 inches.

#### TRIMERESURUS JERDONII. (Plate XXXIV.)

The second upper labial shield forms the front part of the facial pit; one or more small shields between the supranasals. Scales on



the upperside of the head very small, almost granular, those of the body keeled, in twenty-one series. One or two longitudinal rows of scales above, and nearly as large as, the posterior labials. Supraciliary not divided. Ventrals 164-172; subcaudals 42-60. Upper parts greenish brown, with a vertebral series of irregular subrhombic black markings and another series of vertical black spots along the side of the body. Upperside of the head with symmetrical black spots, and an oblique black band from the eye to the angle of the mouth. Lower side yellowish, posteriorly marbled with blackish.

Three specimens of this beautiful Snake were found by the late Dr. Jerdon in Khassya; the largest is 28 inches long, the tail measuring  $4\frac{1}{2}$  inches. The species is allied to *T. anamallensis*, but distinguished by the scutellation of the temporal region and the coloration of the upper part of the head.

4. On Venezuelan Birds collected by Mr. A. Goering.  
Part V.† By P. L. SCLATER, M.A., Ph.D., F.R.S., and  
OSBERT SALVIN, M.A., F.R.S.

[Received March 12, 1875.]

(Plate XXXV.)

Previously to his return to Europe last year, Mr. Goering made a second journey to the Sierra Nevada of Merida, and collected a certain number of birds, which he has kindly given us the opportunity of examining. Most of them belong to species inserted in our list of Mr. Goering's former collection from Merida; but there are some additional species, of which the names are now recorded, in order to make our knowledge of this interesting avifauna as complete as possible. These are as follows:—

*List of additional Species from Merida.*

1. *Turdus gigas*, Fraser ..... Merida.
2. *Myiadestes ralloides* (Lafr. et d'Orb.) Merida.
3. *Thryothorus coraya* (Gm.)..... Merida.
4. *Basileuterus coronatus* (Tsch.) ..... Merida.
5. — *luteoviridis*, Bp ..... Merida.
6. *Vireosylva calidris* (Linn.) ..... Merida.
7. *Diva vassori* (Boiss.) .. Merida.
- \*8. *Chlorospingus chrysophrys*, sp. nov. Merida.
9. *Buarremon brunneinucha* (Lafr.) ... Upper wood-region of Merida.
10. — *assimilis* (Boiss.)..... Merida.
- \*11. — *castaneifrons*, sp. nov. .... Merida.
12. *Spermophila*, sp. inc. (♀) ..... Merida.
13. *Chrysomitris columbiana* (Lafr.) ... Merida.
14. *Myiotheretes striaticollis*, Scl..... Merida.
15. *Ochthæca stictoptera*, Scl. .... Merida.
16. *Tyranniscus nigricapillus* (Lafr.) ... Merida.
17. — *chrysops*, Scl. .... Merida.
18. *Myiarchus nigriceps*, Scl. .... Merida.

† See Part IV., P. Z. S. 1870, p. 779.



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W. & A. G. Smith del.

W. & A. G. Smith imp.

1. MALE BIRD OF THE SPECIES  
 2. FEMALE BIRD OF THE SPECIES



19. *Pachyrhamphus albogriseus*, Scl. ... Merida.  
 20. *Dendroornis erythropygia*, Scl. .... Merida.  
 21. *Dysithamnus semicinereus*, Scl. .... Merida.  
 22. *Grallaria squamigera*, Prevost ..... Sierra Nevada de Merida.  
 23. *Scytalopus griseicollis* (Lafr.) ..... Merida.  
 24. *Lampornis violicauda* (Bodd.) ..... Merida.  
 25. *Doryphora ludovicæ* (Bourc.) ..... Sierra Nevada de Merida.  
 26. *Acestrura heliodori* (Bourc.) ..... Merida.  
 27. *Chætocercus rosæ* (Bourc. et Muls.) Sierra Nevada de Merida.  
 28. *Steganura underwoodi* (Less.) ..... Merida.  
 29. *Lesbia gouldi* (Bourc.) ..... Sierra Nevada de Merida.  
 30. *Cyananthus cyanurus* (Steph.) ..... Merida.  
 31. *Adelomyia melanogenys* (Fraser) ... Sierra Nevada de Merida.  
 32. *Docimastes ensifer* (Boiss.) ..... Merida.  
 33. *Helianthea eos* (Gray and Mitch.) ... Merida.  
 34. *Eriocnemis cupreiventris* (Fras.) ... Merida.  
 35. *Campephilus malherbii*, Gray. .... Merida.  
 \*36. *Aulacorhamphus calorhynchus*, Gould Merida.  
 37. *Pionus seniloides* (Mass. et Souanc.) Merida.  
 38. *Glauucidium phalænoides*, Daud. ... Merida.  
 39. *Asturina leucorrhœa* (Quoy et Gaim.) Merida.  
 \*40. *Querquedula andium*, Scl. et Salv. ... Sierra Nevada, alt. 10,000 ft.  
 41. *Columba albilineata*, Gray ..... Merida.  
 42. *Stegnotrema montagnii*, Bp. .... Merida.

We have a few remarks to offer upon some of these species, and upon some of those in the previous collection, of which additional examples are now sent.

8. *CHLOROSPINGUS CHRYSOPHRYS*, sp. nov.

*Chlorospingus xanthophrys*, Scl. et Salv. P. Z. S. 1870, p. 780 (nec Scl.).

*Supra olivaceus, alis caudaque fuscis olivaceo limbatis, superciliis et corpore subtus flavis: rostro et pedibus fusco-cinereis: long. tota 5.5, alæ 2.75, caudæ 2.3.*

*Hab.* Merida (Goering).

*Obs.* Similis *C. superciliari*, sed superciliis flavis distinctus.

Of this species Mr. Goering obtained three skins at Merida. The two now before us are marked "females;" but the sexes are probably alike in colour. The iris is noted as "brown."

The type of *Chlorospingus xanthophrys* of Sclater (P. Z. S. 1856, p. 30), founded on a single skin in Sclater's collection, does not belong to this species, but is the same as *Basileuterus luteoviridis*. We have therefore changed its specific name to *chrysophrys*.

11. *BUARREMON CASTANEIFRONS*, sp. nov. (Plate XXXV. fig. 1.)

*Buarremon schistaceus*, Scl. et Salv. P. Z. S. 1870, p. 780 (nec Boiss.).

*Supra nigricanti-schistaceus, pileo usque ad frontem clare castaneo: alis caudaque nigris, speculo alari nullo: subtus dilutior, gutture albo: capitis lateribus et striga utrinque gulari angusta nigris: rostro nigro, pedibus clare brunneis, iride brunnea: long. tota 6.5, alæ 2.8, caudæ 3.*



*Hub.* Upper wood-region of the Paramo de la Culata, Merida (Goering).

*Obs.* Assimilis *B. schistaceo*, sed pileo clarius castaneo in frontem producto, loris non albis et speculo alari nullo distinguendus.

Mr. Goering sends two additional examples of this species, which in our previous paper we did not distinguish from *B. schistaceus* of Columbia and Ecuador. It appears, however, to be fairly separable.

In Pern, again, we find another representative species of this section of the *Buarremones*, the *B. mystacalis* of Taczanowski (P. Z. S. 1874, p. 515). In this form there is likewise no white speculum on the wing; but the white lores are very distinct, and the chestnut cap is lighter than even in *B. castaneiceps*. Unfortunately the term *mystacalis* has already been used for a nearly allied species of *Buarremon*†, so that we propose to alter the name of the Peruvian form to *B. tuczanowskii*. Of this bird a figure (Plate XXXV. fig. 2) is also given, for comparison with the allied Venezuelan species.

\*36. *AULACORHAMPHUS CALORHYNCHUS*, Gould, Ann. N. H. ser. 4, vol. xiv. p. 183 (1874).

Mr. Gould's description of this bird was based on examples obtained at Merida by Mr. Goering during his late expedition. We agree with Mr. Gould in regarding this as a new species allied to *A. sulcatus*, but easily distinguishable by the yellow upper mandible. Judging from our specimens of *A. sulcatus*, however, it is not larger, but rather smaller than that species.

Besides *A. calorhynchus*, Mr. Goering obtained, on his second journey, a single specimen of an *Aulacorhamphus* which Mr. Gould (*l. s. c.* p. 184) has referred to his newly described *A. phæolæmus*. After examining this specimen (in Mr. Gould's collection), also a more adult example of the same bird obtained by Mr. Goering on his first expedition to Merida, and now in Salvin and Godman's collection‡, and comparing it with several "Bogota" skins (true *A. albivitta*) and skins obtained by Mr. Salmon in the province of Antioquia (types of Mr. Gould's *A. phæolæmus*), we have come to the conclusion that *A. phæolæmus* is not, in our opinion, fairly separable from *A. albivitta*. In one of Mr. Salmon's skins (in Mus. S.-G.), and in the adult skin obtained by Mr. Goering on his first expedition, the throat is quite as white as in ordinary "Bogota" skins of *A. albivitta*.

We may add that Mr. Goering's specimen of *Aulacorhamphus*, obtained at Caripé, which was determined by us (P. Z. S. 1868, p. 169) as *A. sulcatus*, is Mr. Gould's *A. erythrognathus* (*l. s. c.* p. 184), but that Mr. Goering has also sent home the true *A. sulcatus* from S. Esteban (*cf.* P. Z. S. 1868, p. 629). The distinction between these two nearly allied forms, though slight, appears to be valid.

† *Arremon mystacalis*, Sclater, Rev. et Mag. de Zool. 1852, p. 8, = *Buarremon albifrenatus* (Boiss.).

‡ See P. Z. S. 1870, p. 782.

## 40. QUERQUEDULA ANDIUM.

*Querquedula andium*, Scl. et Salv. Nomencl. p. 129 et p. 162.

This species was founded on Fraser's specimen, obtained in the Andes of Ecuador. Mr. Salvin has also two skins from another collection made in the same country.

Mr. Goering's example from the Sierra Nevada of Merida, at an altitude of 10,000 feet, agrees in every respect. The most salient characters of this Duck are its black bill and generally darker plumage.

After leaving Merida, on his last journey, Mr. Goering traversed the line of the Andes to San Cristoval, in the province of Tachira, on the frontiers of Columbia, where he obtained examples of the following thirty-three species :—

1. *Microcerculus squamulatus*, Scl. et Salv.
2. *Dacnis cayana* (Linn.).
3. *Calliste nigriviridis* (Lafr.).
4. ——— *cyaneicollis* (Lafr. et d'Orb.).
5. ——— *guttata* (Cab.).
6. *Phænicothraupis*, sp. inc., ♀.
7. *Saltator magnus* (Gm.).
8. *Cissopis minor* (Tsch.).
9. *Orchesticus ater* (Gm.).
10. *Phonipara pusilla* (Sw.).
11. *Emberizoides macrurus* (Gm.).
12. *Fluvicola pica* (Bodd.).
13. *Myiodynastes chrysocephalus* (Tsch.).
14. ——— *audax* (Gm.).
15. *Pipra leucocilla* (Linn.).
- \*16. *Rupicola peruviana* (Lath.).
17. *Dendrocolaptes validus* (Tsch.).
18. *Hypocnemis leucophrys* (Tsch.).
19. *Chamæza olivacea* (Tsch.).
20. *Phaethornis guyi* (Less.).
21. *Sternoclyta cyanepectus* (Gould).
22. *Thalurania columbica* (Bourc. et Muls.).
23. *Nyctibius grandis* (Gm.).
24. *Antrostomus rufus* (Gm.).
25. *Nyctidromus albicollis* (Gm.).
26. *Chloronerpes rubiginosus* (Sw.).
- \*27. ——— *xanthochlorus*, sp. nov.
28. *Melanerpes cruentatus* (Bodd.).
29. *Ceryle amazona* (Lath.).
30. *Malacoptila mystacalis* (Lafr.).
31. *Coccyzus americanus* (Linn.).
- \*32. *Caica pyrilia* (Bp.).
33. *Milvago chimachima* (Vieill.).

We have remarks to make on the following species :—

16. *RUPICOLA PERUVIANA* (Vieill.).

San Cristoval is the most eastern locality yet noted for the Peruvian Cock-of-the-Rock, which extends hence throughout the chain of the Andes into Bolivia. (See our remarks on the distribution of *Rupicola*, Ex. Orn. p. 29.)

27. *CHLORONERPES XANTHOCHLORUS*, sp. nov.

Fem. *Supra olivaceus, pileo toto cum nucha et linea utrinque a rictu ad cervicem ducta brunnescenti-flavis: capitis lateribus fuscis: subtus brunnescenti-flavus, nisi in gula crebre fusco transfasciatus: remigum marginibus internis clare rufis immaculatis; horum apicibus nigricantibus: cauda olivacea, rectricum apicibus nigricantibus: rostro et pedibus nigris: long. tota 8, alæ 5, caudæ 2.9, rostri a rictu 1.1.*

*Hab.* San Cristoval, prov. Tachira, Venezuela (Goering).

*Obs.* Similis feminae *C. chrysochlori*, sed pileo aureo diversus.

Of this *Chloronerpes* Mr. Goering obtained a single example at San Cristoval. It appears to be the female of the species, nearly related to *C. chrysochlorus* of Brazil, of which there is a female in Selater's collection. From this Mr. Goering's bird is conspicuously different, in that the head and nape are of a bright brownish yellow, instead of being olive like the back, as is the case in *C. chrysochlorus*. The male of *C. xanthochlorus* will, no doubt, have more or less red on the head, as is the case in the allied species.

32. *CAICA PYRILIA*, Bp.

A single specimen of this beautiful Parrot was obtained by Mr. Goering at San Cristoval, and is now in Salvin and Godman's collection. See our note on this species in Mr. Wyatt's article on the Birds of Columbia (*Ibis*, 1871, p. 381).

5. Descriptions of new Species of *Sphingidæ*.

By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Received March 4, 1875.]

(Plates XXXVI. & XXXVII.)

In consequence of the numerous new species discovered in Mr. Moore's rich collection of Eastern *Sphingidæ*, it has been proposed that I should relieve my memoir on this subject by forming a separate paper of the descriptions of them for the 'Proceedings.' I have, however, left one or two new forms in the original paper, either because the descriptions were very short and the species unimportant, or because I considered it advisable to have certain characters before the eye of the student when examining into the species which I have separated in a genus.

The characters of the subfamilies and of most of the new genera are retained in the above-mentioned revision: descriptions of larvæ are also, for the most part, left in that paper.



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Butler del et lith March 1875.

Mintern Bros imp

NEW SPECIES OF SPHINGIDÆ.







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6.



## Subfamily MACROGLOSSINÆ.

## Genus SATASPES, Moore.

## 1. SATASPES XYLOCOPARIS, n. sp. (Plate XXXVI. fig. 1.)

Primaries semitransparent smoky brown, basal half crossed by three black bands, the innermost near the base three times as broad as the others, the outermost diffused, oblique, crossing the wing at the end of the cell; base grey; secondaries with apical area to first median branch semitransparent brown; anal-abdominal area opaque, black-brown; nervures blackish; costa silvery white; head, palpi, and antennæ above dull black; thorax bright golden yellow, collar blackish behind; abdomen black; the third, fourth, fifth, and sixth segments clothed with yellow hairs, with yellow-tipped black lateral tufts; anal tuft black; wings below somewhat lilacine, black-brown at base, veins black; palpi below slate-coloured; thorax dark brown, yellow at base of wings; abdomen black, segments slate-coloured at the margins. Expanse of wings 2 inches 11 lines.

Shanghai, China.

Type, coll. F. Moore.

This handsome species is allied to *S. uniformis* and *S. ventralis*. The species of *Sataspes* appear to mimic *Xylocopa æstuans* and *X. flavonigrescens*.

## Genus HEMARIS, Dalman.

## 2. HEMARIS MANDARINA, n. sp. (Plate XXXVI. fig. 2.)

Nearly allied to *H. sieboldi* (*whitelyi*, Butl.), but differs in the coloration of the secondaries (which is like that of *H. radians*), the basal and abdominal areas above being ochreous, the costa pale yellow; primaries below with basal half of costa ochreous; inner margin pale yellow, ochreous in front; secondaries with costa, base, and abdominal area ochreous; palpi and pectus pale testaceous. Expanse of wings 2 inches 1 line.

Shanghai, China.

Type, coll. F. Moore.

This species bears much the same relation to *H. radians* that *H. sieboldi* does to *H. alternata*, the dark brown border of primaries being strongly denticulated in *H. radians* and *H. alternata*, but entire in *H. sieboldi* and *H. mandarina*.

## Genus RHOPALOPSYCHE, n. gen.

Allied to *Macroglossa*, but at once distinguished by the distinctly clubbed antennæ, resembling those of a Hesperidian butterfly: the wings are also somewhat shorter and the terminal joint of palpi more prominent.

Type, *R. nycteris* of Kollar.

## 3. RHOPALOPSYCHE BIFASCIATA, n. sp. (Plate XXXVI. fig. 4.)

Primaries with basal two thirds and outer margin brownish cinereous, disk red-brown; two parallel central transverse dark brown bands: secondaries orange-yellow; outer margin, except at anal angle, rather broadly dark brown; body brownish grey; metathorax,



tips of pterygodes, and base of abdomen clothed with red-brown hairs; three basal segments orange-yellow at the sides; subterminal segment edged behind with an interrupted white fringe; anal black, greyish at the tip; lateral tufts brown, tipped with whitish: wings below reddish, ferruginous yellow at base, with brown border to outer margin; secondaries with abdominal area broadly yellow; two or three indistinct ferruginous transverse lines: palpi white; pectus whitish; abdomen and base of anal tuft rosy brown; lateral tufts brown, with white tips. Expanse of wings 1 inch 7 lines.

South India (*Ward*).

Type, coll. F. Moore.

Genus MACROGLOSSA, Ochsenheimer.

4. MACROGLOSSA AFFICTITIA, n. sp. (Plate XXXVI. fig. 7.)

Nearly allied to *M. gyrans* and *M. belis*; from the former it differs above in having the outer borders of secondaries better defined, the orange band consequently less diffused and not so red in tint; the white fringe to the last segment but one less pure in colour; the wings below with all the transverse brown lines strongly marked, as in *M. belis*, brownish testaceous in colour; discoidal cell of primaries clothed with golden yellow hairs; abdominal area of secondaries orange; palpi below white, pectus whity brown, abdomen brownish testaceous: from *M. belis* it differs above in the duller orange band of secondaries, and in having the lateral orange spots on the abdomen united (as in *M. gyrans*), and the last segment but one bordered with sordid white; below it differs in the altogether browner tint of the wings. Expanse of wings 2 inches.

Canara.

Type, coll. F. Moore.

We have what I believe to be a small variety of this species in the British Museum; it is, however, much darker, and is said to come from North India.

5. MACROGLOSSA VIALIS, n. sp. (Plate XXXVI. fig. 5.)

Nearly allied to *M. gyrans*; but the primaries above with the transverse lines much more distinct, and the central area between the second and third lines whitish brown, forming a distinct sub-central white band: secondaries with the outer margin broadly and distinctly bordered with brown; sides of body reddish, the lateral abdominal tufts yellowish; transverse lines on underside of wings more distinct. Expanse of wings 1 inch 7 lines.

Canara.

Type, coll. F. Moore.

This species seems to stand in the same relation to *M. gyrans* as *M. sitiene* does to *M. belis*.

6. MACROGLOSSA AVICULA, Boisd.

Wings above dark pitchy brown, primaries with a lilacine tint, crossed by two transverse central blackish bars; a bifid subapical quadrate spot; secondaries with the costa testaceous: head, thorax, and three basal segments olive-green, the latter marked at the sides by quadrate orange spots; the fourth and fifth segments pitchy, in-

errupted in the middle by a cruciform paler brown marking; the fifth segment bordered behind by ochreous scales; terminal segments red-brown, blackish in the middle; anal tuft black at base, red-brown at tip; lateral tufts black at base, tawny at tips: wings below chocolate brown, transversely crossed by indistinct nebulous brown bars, base bright yellow; primaries with inner margin testaceous; palpi and thorax below creamy: abdomen red-brown; basal segments with a central longitudinal yellow patch; lateral tufts black, tipped with ochreous; anal tuft as above. Expanse of wings 1 inch 9 lines.

Java (*Argent*).

Type, B.M.

Nearly allied to *M. bombylans*, but differing in several important points.

7. *MACROGLOSSA GLAUOPTERA*, n. sp. (Plate XXXVI. fig. 9.)

Primaries above shining dark slaty grey, base very dark; two dark brown transverse subparallel bands, edged with black; two waved parallel discal lines from external angle to costa: secondaries with the costa silky stramineous, basal half orange, interrupted at base by two diverging black dashes, outer margin to near middle of wing dark brown: body dull tawny; abdomen with ferruginous lateral and central spots, also whitish-tipped ferruginous lateral tufts; anal tuft black, pale rosy brown at the tip: wings below deep ferruginous, base and abdominal area of secondaries golden yellow; outer margin brownish, two or three indistinct transverse brown lines: palpi below missing, probably white; pectus sordid whitish, reddish laterally; abdomen ferruginous, lateral tufts brown, tipped with pale ochreous; anal tuft red-brown. Expanse of wings 2 inches.

Ceylon (*T. Skinner*).

One bad example, coll. F. Moore.

8. *MACROGLOSSA NIGRIFASCIATA*, n. sp. (Plate XXXVII. fig. 3.)

Primaries above greyish brown, somewhat slaty towards base; a black transverse subbasal band, beginning very broad on inner margin and narrowing to costal nervure; an angulated and curved black-edged olivaceous discal band; outer margin from costa to external angle olive-brown; a blackish subapical spot: secondaries orange, costa stramineous, base with two diverging black dashes; outer margin broadly black-brown: body olivaceous, three basal segments with lateral orange spots, terminal segments with lateral white-tipped black tufts; anal tuft rosy-brown: wings below dull ferruginous, becoming smoky brown on outer margin, yellow at base; secondaries with a large pyriform abdominal golden-yellow patch; disk crossed by two or three brown lines; palpi missing; pectus and centre of venter whity-brown, remainder of abdomen black-brown. Expanse of wings 2 inches 1 line.

Ceylon.

One bad example, coll. F. Moore.

9. *MACROGLOSSA LUTEATA*, n. sp. (Plate XXXVII. fig. 5.)

Nearly allied to *M. proxima*: primaries dark brown, becoming lilacine in the centre, crossed near base by a dark oblique band, and

beyond the middle by two parallel slightly waved lines: secondaries dark brown, with a central ochreous band; costa testaceous; body dark brownish grey; anal tuft dark brown, tipped with reddish; three basal segments with small lateral ochreous spots; wings below rather brighter than in *M. proxima*, body paler, otherwise the same. Expanse of wings 2 inches 7 lines.

Silhet.

Type, coll. F. Moore.

Only one rather damaged example; it may at once be distinguished from *M. proxima* by the more distinct and paler band of secondaries.

10. *MACROGLOSSA INTERRUPTA*, n. sp. (Plate XXXVII. fig. 2.)

Nearly allied to the preceding; palpi shorter: primaries brown, a blackish subbasal marking, united below, trifasciate above; a very indistinct angulated band from costa just beyond cell to external angle; outer margin with a zigzag olive-brown border from apex to second median branch; a subapical black lunule, touching the border: secondaries with the costa and base pale brown; two diverging basal black streaks, outer margin very broadly black-brown, anal angle very narrowly bordered with brown; a central orange-yellow transverse band, interrupted below first median branch; an oval basicostal orange-yellow spot: body red-brown; abdomen transversely banded with black, three basal segments with lateral oval yellow spots: wings and body below as in *M. belis*. Expanse of wings 2 inches 1 line.

Darjeeling.

Type, coll. F. Moore.

11. *MACROGLOSSA PYRRHOSTICTA*, n. sp. (Plate XXXVI. fig. 8.)

Wings above almost exactly like *M. corythus*; abdomen greyer, the subterminal segment edged with an interrupted white fringe: primaries below red-brown, yellow at base, inner margin whitish, disco-submarginal area red; outer margin smoky brown: secondaries tawny, abdominal area and base golden yellow; outer margin and centre of costa brown; three irregular red-brown transverse lines: palpi below white; pectus whitish, pale rosy brown at the sides: abdomen brown, with a central and lateral series of large red spots; second and third segments with a small lateral white dot. Expanse of wings 2 inches 3 lines.

Shanghai, China.

Type, coll. F. Moore.

This beautiful species may at once be distinguished from all its allies, excepting the little *M. insipida*, by the peculiar coloration of the under surface. The larva is stone-colour whitish-speckled, the anterior segments greenish, the horn, two lines on each side of the dorsal region, and six or seven oblique lines between the spiracles (which are black) green. It feeds on a beautiful but unpleasant-smelling creeping plant with waxy crimson-and-white flowers; Mr. Lewis found it upon this plant in company with the larva of *M. gilia*.

12. *MACROGLOSSA INSIPIDA*, n. sp.

Like a small form of *M. catapyrrha*, but the secondaries above

with a broader orange band and, consequently, a narrower marginal brown border, primaries not varied with tawny; below like *M. pyrhosticta*, but the secondaries rather redder. Expanse of wings 1 inch 6 lines.

Ceylon (*Skinner*).

Type, coll. F. Moore.

13. *MACROGLOSSA CATAPYRRHA*, n. sp. (Plate XXXVI. fig. 6.)

Nearly allied to *M. fraterna*; primaries purplish slate-colour, crossed by brown lines as in that species, *M. belis*, and *M. corythus*, but with the subapical dark spot less distinct, and the bands (formed by double lines) more or less tawny; secondaries exactly as in *M. fraterna*: body purplish slate-colour; pterygodes, collar, and sides of abdomen ferruginous; three lateral quadrate orange spots and dorsal double series of blackish spots as in *M. fraterna*; subterminal segment edged with white behind: wings below ferruginous, yellow at base, with terminal irregular brown border; usual brown transverse lines; palpi and coxæ whitish; sides of thorax and abdomen bright ferruginous, the second and third segments with a white lateral dot; lateral tufts tipped with ochreous. Expanse of wings 1 inch 11 lines.

N. India (*coll. F. Moore*); Ceylon (*Templeton*).

B.M.

14. *MACROGLOSSA HEMICHROMA*, n. sp. (Plate XXXVII. fig. 1.)

Allied to *M. fano*, but the basal half of primaries grey sharply defined and paler externally; the apical half olive-brown, darkest internally, outer margin sprinkled with paler scales: secondaries as in *M. fano*, dark brown with a central orange band; costa testaceous: head and thorax reddish brown, with a dark dorsal line: abdomen dark brown, the three basal segments with yellow spots; lateral tufts dark brown, tipped with white; anal tuft dark brown, paler at the tip: wings below reddish brown, outer margin with a darker border; secondaries with a large pyriform orange-yellow abdominal patch, four or five transverse dark brown lines; body below grey, palpi and prothorax sordid white. Expanse of wings 2 inch 8 lines.

Silhet.

Type, coll. F. Moore.

Only one example, not in very good condition.

15. *MACROGLOSSA IMPERATOR*, n. sp. (Plate XXXVII. fig. 4.)

Primaries above dark brown, almost black, with the base and basal two thirds of costa dark grey; outer margin paler grey; a large costal subapical patch, a disco-submarginal irregular streak (near external angle and extending to lower radial nervure), and a transverse straight central band whitish brown; secondaries black-brown, with a broad central irregular orange band, costa testaceous; head grey, with a central piceous streak; thorax piceous, with two parallel longitudinal grey bands, reddish posteriorly; abdomen glossy grey, with lateral series of quadrate black spots; second and third segments with small lateral orange spots; lateral tufts black-brown, tipped with white; anal tuft black-brown (incomplete):



primaries below dull ferruginous, yellow at base and smoky along costa; a submarginal irregular ochraceous band, diffused in the centre internally, intersected and partially bounded by brown lines; outer margin brown: secondaries dull pale tawny, becoming golden yellow on abdominal area; costa and base greyish; disk crossed by two lunulated discal parallel lines; outer margin unequally bordered with brown: palpi white; pectus reddish grey; abdomen grey, irrorated with tawny scales. Expanse of wings 2 inches 7 lines.

Ceylon (*T. Skinner*).

Type, coll. F. Moore.

This magnificent species approaches *M. mitchellii* of Boisduval.

#### Genus *LOPHURA*, Walker.

##### 16. *LOPHURA MASURIENSIS*, n. sp. (Plate XXXVI. fig. 3.)

♂ ♀. Primaries above pale rose-brown, varied with greyish lilacine; two black dots near the base, four indistinct oblique sub-angulated transverse brown lines; a central subolivaceous oblique band, intersected by two opposed bisinuated black lines and interrupted at end of cell by a triangular olivaceous patch, bounded on one side by the costa, enclosing a discocellular pitchy spot crossed by a pale brown streak, and limited just below third median branch by a black litura; disk hatched and clouded with olive-brown, a short bimacular whitish litura running obliquely inwards from excavation of inner margin; an irregular sinuated brown disco-submarginal line, terminating upon costa in a brown lunate spot; costa from the latter to base brown-spotted; outer margin irregularly red-brown, edged internally with black towards apex and bounded by a lilacine nebula: secondaries with basal half orange, apical half dark pitchy brown; costa whitish, varied with blackish: body rose-brown, head with a central V-shaped brown marking: thorax streaked with olivaceous or reddish brown: abdomen rather cinereous in the centre, tawny at the sides, with the segments pink-edged and fringed with dark brown, two lateral series of oblique red-brown dots, the inner series interrupted above the fourth segment; anal tuft cinereous in the centre, black-brown at the sides: primaries below dark brown, base yellowish; an interrupted tawny spot at end of cell; the disk near costa and inner margin tawny ochraceous, varied with whitish and hatched with dark brown; outer margin shining slate-colour, inner margin dotted with whitish: secondaries tawny ochraceous, whitish on abdominal area, hatched and dotted with red-brown, costa grey-spotted; outer margin dark cinereous, black-edged internally: body below pinkish grey at the sides, reddish ochraceous in the centre; abdomen with a double ventral series of triangular white points; lateral tufts brown. Expanse of wings 1 inch 9 lines.

♂ ♀ Masuri, N.W. Himalayas.

Type, coll. F. Moore.

##### 17. *LOPHURA PUSILLA*, n. sp.

Primaries above grey, with pink reflections; a white-edged sub-basal nebulous brown spot; a central oblique olive-brown band fading away at first median branch, and on each side of it a brown litura; a subtriangular brown patch at end of cell, interrupted by

the whitish discocellulars; two wavy brown-edged whitish lines; a reddish streak near external angle, and a black spot on inner margin; a brownish oblique nebula from outer margin near the angle to costa; outer margin partially but narrowly edged with dark brown: secondaries ochreous, outer margin broadly ferruginous, dotted with brown scales; inner margin edged with blackish: body greyish brown; abdomen reddish at the sides: wings below reddish ochreous, irrorated with brown; costa greyish, a whitish spot at end of each cell; primaries with inner margin grey, outer margin broadly brown; secondaries with abdominal area yellowish, two central transverse brown lines: body below grey, sprinkled with ferruginous scales. Expanse of wings 1 inch  $2-2\frac{1}{2}$  lines.

Silhet.

Type, coll. F. Moore.

### Subfamily CHÆROCAMPINÆ.

#### Genus ACOSMERYX, Boisduval.

General appearance of the *Mimas* group of the *Smerinthinae* (*Polyptychus*): body more robust; male with a short anal tuft; palpi much larger; wings shorter and broader; primaries with outer margin subangulated in the middle and generally undulated; discocellulars below obscured by long scales: secondaries much broader, costal margin more convex, inner margin longer; outer margin more or less undulated: larva of the *Chærocampa* type.

The larva of *A. anceus* is figured in Moore and Horsfield's Catalogue, pl. ix. fig. 4. I have also seen a figure sent by S. N. Ward (from Canara) to Mr. Moore, which appears to be either a variety of the same larva or a distinct but nearly allied species; the moth not being so well figured as the larva, I cannot be certain; it is possible that it may be *A. sericeus*: the anal horn of the larva is long, dark, and curved.

#### 18. ACOSMERYX CINEREA, n. sp.

Allied to *A. sericea*, but both sexes generally coloured as in *A. anceus* ♀, silvery grey tinted with brown; primaries crossed by six or seven oblique pale brown lines, and from costa to external angle by a brown bar; outer margin brown, bordered internally by a nebulous silvery streak; secondaries crossed beyond the middle by a pale brown bar, apex and outer margin pale brown, bounded internally by a reddish tint: body brownish grey; antennæ testaceous: wings below very similar to *M. sericea*, but altogether paler, very slightly tinted with reddish; secondaries crossed by four indistinct brown lines in pairs, apex grey: body below pale reddish brown. Expanse of wings 3 inches 7 lines.

Silhet (*Argent*).

Type, B.M.

We have three example of this species; it may at once be distinguished from *A. sericea* (irrespective of coloration) by the less-produced primaries, with scarcely undulated outer margin. Mr. Moore has a pair from Silhet and N.E. Bengal, which have the primaries coloured like *A. sericea*.